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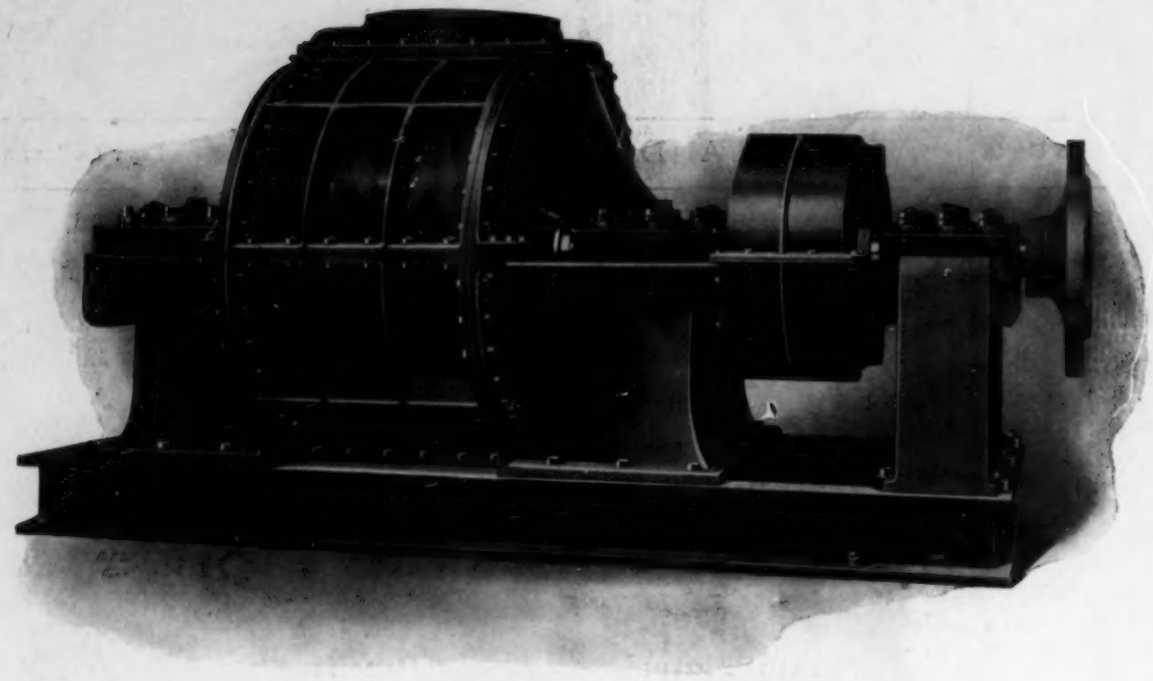

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THE IRON TRADE REVIEW

Vol. LIX Cleveland, August 24, 1916 *No. 8*

Markets Are Extremely Active

Large Tonnages of Basic Pig Iron Bought—Allies Still Placing Orders for Shells and Shell Steel and Seeking Larger Quantities

THE market is stronger than ever. The buying of pig iron has now reached a large volume and in finished lines all products are active and consumers are doing their utmost to hasten deliveries. The general tendency is toward higher prices, excepting on scrap, which still drags.

Pig Iron

Buying of pig iron has been very active, especially of basic, of which purchases included 40,000 tons by the American Rolling Mill Co., most of which will come from Columbus, 20,000 tons for the Andrews Steel Co., 30,000 tons for the Scullin Steel Co., St. Louis, and about 20,000 tons for other melters in the St. Louis district. The Hewitt Steel Corporation, Newark, N. J., has purchased 11,000 tons of basic, and a Phoenixville company 6,000 tons, while the Whitaker-Glessner Co. has added 18,000 tons to its recent purchases. The Republic Iron & Steel Co. has purchased 15,000 tons of bessemer and is understood to have bought about the same tonnage of basic. Indications of a shortage in steelmaking irons are more pronounced. There is fair activity in foundry grades, the principal buyer being the General Electric Co., which has taken 13,000 tons of foundry, malleable and low phosphorus. Sales of various grades at Buffalo are estimated at about 50,000 tons. The stocks of the Eastern Pig Iron Association are the smallest ever known. In the south, careful investigation shows that there is increased activity among the foundries, which are operating at about 85 per cent of full time.

Shell Steel

Heavy buying in finished shells and shell steel for the entente allies continues and during the past week a large part of the business has consisted of forgings for shells for deliveries extending from November to April, and in some cases, farther into next year. An industrial company has booked an additional forging contract and has bought from 35,000 to 40,000 tons of steel from central western makers. A large eastern steel and shell maker has closed a contract for finished shells and forgings amounting to several hundred thousand. An eastern Pennsylvania company has closed a large contract for shell steel reported to amount to over 100,000 tons, and a Harrisburg company has received a new order for 200,000 shell forgings for the British. An eastern locomotive builder is in the market for 30,000 to 50,000 forgings for shells, which will require from 5,000 to 7,000 tons of steel. Plants which have shown their ability to turn out these products are taking on additional orders very freely. The principal trouble is in obtaining the steel, for which very high prices are being named.

Railroad Buying

While car buying is showing more life, orders are being confined very largely to wooden cars, owing to the high cost of steel material. An interesting development is shown in the tendency to repair old cars wherever it can possibly be done. Some of the inquiries for equipment for export promise to be closed at an early date, including the Russian order for 1,000 locomotives, which has been pending for some time. Contracting by domestic roads for rails for delivery in 1918 may begin in the near future, as the mills are rapidly filling up on orders for delivery far into next year.

Shapes and Plates

J. P. Morgan & Co. are endeavoring to place orders for from 50,000 to 70,000 tons of plain and structural shapes and it is believed that a considerable part of this tonnage is intended for use in the trenches. Numerous new building projects, including some apartment houses, are developing in New York and the structural market on the whole is much stronger. Manufacturing concerns are finding that they will not be able to complete plant additions as planned and in some cases concrete construction will be adopted. In plates, the demand for ship building is still very strong and prices are high. Automobile manufacturers are very anxious to contract for sheets for the first half of next year, but so far have been unable to do so. Tin plate is likely to ascend to very high prices.

THE OPEN HEARTH

Complaining About Exports

THE tremendous increase in exports from this country during the past year has brought about a remarkable condition. It does indeed seem strange that following the efforts which have been made for years to build up the foreign trade of the United States, the coming of a great demand from lands across the seas has caused much complaint on the part of domestic consumers. For example, a representative of the agricultural implement manufacturers has written us a strong protest against what he considers the unjust policy now being followed by some manufacturers. He expresses the belief that as iron ore is one of the country's most important natural resources, the domestic consumer of products resulting from the smelting of ore and rolling of steel has a right to expect more consideration in the disposition of these products than the foreign buyer.

"One of the foreign nations," says our correspondent, "not long ago stopped the export of potash and cancelled American contracts, feeling that its people might suffer, but in this country we place on a parity the foreign and domestic buyer and give no thought as to what effect the enormous exportations will have on the future supply. We do not believe, however, that this will continue any great length of time without attention being given to it and when the situation is realized, we are likely to have, as is so frequently the case, regulations that are both drastic and undesirable."

Owing to the tremendous profits that are being made in the manufacture of munitions, there is unquestionably the temptation, to which some manufacturers may have yielded, to take care of foreign business without due consideration to the domestic demand. But in the matter of the price of steel bars as compared with prices of steel used in the manufacture of munitions, we believe that the agricultural implement manufacturers have no reason to complain. The price of 2.50c, Pittsburgh, recently announced, is far below that charged for a very large percentage of the steel which has been sold to foreign buyers and to domestic manufacturers of munitions.

As to drastic regulations, hinted at by our correspondent, we have no fear. It would be extremely difficult to frame a constitutional law which would prevent selling of steel and other products for export and it is likely that before any such legislation could be placed on the statute books, conditions would change so that manufacturers in this country would be very glad to accept any foreign business offered. After the war, this country will be puzzled as to how to prevent exports from declining rapidly.

Our correspondent states that he is endeavoring to take an optimistic view of the matter and to prevent, as far as possible, a curtailment of the volume of purchases by the farmers, but he adds: "There is a very considerable question as to what success we shall have, for the advances we will be compelled to make are most extraordinary and we know from past experience, the attitude of the American farmer under such conditions." The purchase of agricultural implements probably will be somewhat diminished this year, but as long as the American farmer continues to buy automobiles, as he has been doing for some time past—automobiles made from material which has advanced in price in harmony with other things—his complaints in regard to prices of agricultural implements will not be very impressive.

The Passing of the Bee-Hive Oven

EVEN the casual student of the coke business could not fail to observe during the past 10 years the steady progress of the manufacture of by-product fuel, but the real significance of the revolution that is going on was not disclosed until the Connellsville Coal Traffic Association recently presented to the interstate commerce commission at Washington a striking array of facts.

The Connellsville association is very anxious to have freight rates applying to the Pittsburgh district on western shipment and those applying to the Westmoreland district on eastern shipment extended to the Connellsville field. Although Connellsville coke will continue to play an important part in the general iron trade for many years to come, it is cited by Connellsville cokemakers that the demand for bee-hive coke is diminishing very rapidly. Hence Connellsville ovens must become factors in the bituminous coal trade and for this reason they are endeavoring to ship coal to by-product coke oven plants in the east, central west and west.

W. E. Fohl, Pittsburgh mining engineer, has testified to the foreign examiner of the interstate commerce commission that a tremendous tonnage of coke formerly supplied by bee-hive ovens has been supplanted by by-product fuel in the last decade. Mr. Fohl presented a number of exhibits, including one showing the production of by-product coke compared with that of bee-hive coke, with the percentage of the total for the years 1893 to 1915, inclusive. In 1893, bee-hive ovens furnished 99.99 per cent of the coke used, and in 1915 they furnished only 66 per cent of the total coke production. Another exhibit indicated the rapid growth of the building of by-product ovens. The Steel Corporation alone owns or is building 2,500 retort ovens having an estimated coal consuming capacity of 15,371,500 tons and an estimated annual

THE OPEN HEARTH

coke producing capacity of 10,551,500 tons.

These facts and others presented show clearly that the bee-hive oven is doomed.

Its passing is demanded by the necessity of conservation of the natural resources of the country and is hastened by the opportunity now presented to this country of utilizing by-products of coke-making as never before in its history.

The readjustment of the coke industry to new conditions will be a severe one for some of those affected, as are many other industrial readjustments. We have no desire to pass judgment on the justice of the claims relating to freight rates which have been set up by the association, but they certainly are entitled to most careful consideration at the hands of the interstate commerce commission.

Broadening the National Vision

SALUTARY effects growing out of the present extensive export commerce being done by the manufacturers of the country at the present time, it goes without saying, will be of the greatest importance. Some of the immediate and favorable results of this tremendous traffic readily are perceivable. Not the least of these is the strong financial position now being reached by many companies which heretofore have been only mildly successful in their operations, or have been undergoing a seasoning process until they could establish themselves firmly. This retirement of bond issues and notes, and other forms of funded debt and the additions being made to sinking funds and financial resources spell greater stability for the careers of these companies and perhaps more uniform market conditions in their respective lines for the future. Then the creation and stimulation of jaded or new branches of industry, due to the great export trade and its ramifications, hold forth promises of much permanent benefit to the country. A view of the highly vigorous and expanding ship building industry is a cause for much gratification both from purely commercial and from patriotic reasons.

One of the greatest influences flowing from the expansive foreign trade, however, promises to be personal. Many American business men have been so trained to consider and to seek only home custom that they have lacked the broad vision that only can come from dealing with different peoples under different conditions. In some senses, the American manufacturer has been somewhat like a spoiled child, as his home market has been so large that he cared little for foreign business unless the conditions were in accordance with his individual wishes. The iron and steel industry has had its share of this seeming provincialism. Now the overwhelming demand for American products, especially those of iron and steel, by its very force and lucrativeness has made many producers more eager to sell for foreign account. As a consequence, they are familiarizing themselves more thoroughly with the machinery of overseas trade and are acquiring a keener appreciation of its requirements and obstacles. Incidentally, they are broadening their own business capacity and vision. This instructive process is progressing steadily and it should be the means of establishing in this country clearer thought and more powerful initiative on questions bearing upon our relations with foreign countries and with the high seas. The growing appreciation of the importance of a comparable merchant marine is a hopeful sign. Henceforth this movement should not be lacking in the scope and power of support from the business interests of the country, if they hold true to the lessons they have been acquiring by their more general activity in foreign trade.

One of the amusing things nowadays is the spectacle of some agricultural implement manufacturers buying steel bars at 2.50c, Pittsburgh, who recently ridiculed the "unreliable reports" that buying was being done at 2.35c, which was declared to be much too high!

Weakened Patriotism

(From an address by E. Burt Fenton, New York, recently, before Ohio Electric Light Association, Cedar Point, O.)

There is a widespread belief among honest men and potentially good citizens that by some sort of magic government can do anything and everything, whether equipped to do it or not. This idea has been drilled into the people for nearly a score of years. * * * In recent years, this agitation has found expression in the slogan that every resident is a "stockholder" in his city, state and nation—that his rights are those of a holder of securities in a business enterprise.

This, to my mind, is bringing patriotism to a dangerously low level. For myself, I can never regard the flag of my country as nothing more than stock certificate.

And yet many men—honest, well meaning men, too,—have been led to take this sordid view. The result is a weakened patriotism.

Perhaps you have noticed during the recent past that great difficulty was experienced in some places in enlisting volunteers for service on the Mexican border. Have you noticed, also, that where this condition existed there has been much agitation in favor of having government do many things it is not equipped to do?

I wonder if you have also noticed, lately, that men who have been loudest in advocacy of governmental operation of anything and everything under the sun have been weakest in their advocacy of the adequate defense of our country—when they have not actively opposed all measures of preparedness.

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products August 23, average for July, 1916, average for May, 1916, and average for August, 1915. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Aug. 23, 1916.	Aver. for July, 1916.	Average for May, 1916.	Aver. for Aug., 1915.
Bessemer pig iron, Pittsburgh	$21.95	$21.95	$21.95	$15.89
Basic pig iron, Pittsburgh	18.95	18.95	18.95	14.89
No. 2 Fdy. pig iron, Pittsburgh	19.45	19.45	19.325	14.70
Northern No. 2 Fdy., Chgo.	19.00	19.00	19.00	13.40
Lake Superior Charcoal, Chgo.	19.75	19.75	19.75	15.75
Mall. Bess., Chgo.	19.50	19.50	19.50	13.40
Southern No. 2, Birmingham	13.50	14.00	14.95	11.00
Southern Ohio No. 2, Ironton	18.50	18.38	18.46	13.63
Basic, eastern Pa.	19.50	19.25	20.50	15.25
No. 2X Virginia furnace	18.50	18.50	18.50	13.00
No. 2X foundry, Philadelphia	19.75	20.00	20.75	15.25
Ferro mang., Balti.	170.00	175.00	175.00	105.00
Bessemer billets, Pbgh.	45.00	40.00	44.25	23.00
Bess. sheet bars, Pbgh.	45.00	40.00	44.25	24.00
Op.-h'th sh. bars, Pbgh.	45.00	40.00	44.25	25.00
Open-hearth billets, Pbgh.	45.00	40.00	44.25	24.00
Steel bars, Chgo.	3.10	2.69	2.69	1.49
Steel bars, Pittsburgh, contr.	2.60	2.50	2.50	1.30
Iron bars, Philadelphia	2.559	2.559	2.559	1.40
Iron bars, Cleveland, local del'y.	2.40	2.40	2.40	1.22
Iron bars, Chgo. mill	$2.35	$2.35	$2.35	$1.23
Beams, Chgo.	3.10	2.69	2.69	1.49
Beams, Pittsburgh, contr.	2.60	2.50	2.50	1.30
Beams, Philadelphia	2.759	2.659	2.659	1.45
Tank plates, Pbgh., contract	3.00	2.86	2.75	1.30
Tank plates, Chicago	3.50	3.09	3.09	1.44
Tank plates, Philadelphia	3.909	3.909	3.909	1.45
Sheets, blk., No. 28, Pbgh.	2.90	2.90	2.925	1.83
Sheets, blue an., No. 10, Pbgh.	3.00	3.00	3.02	1.36
Sheets, galv., No. 28, Pbgh.	4.25	4.37	4.88	3.93
Wire nails, Pittsburgh	2.60	2.50	2.50	1.61
Connellsville fur. coke, contr.	2.40	2.42	2.60	1.75
Connellsville fdy. coke, contr.	3.15	3.15	3.50	2.25
Heavy melting steel, Pbgh.	16.00	16.25	17.125	13.38
Heavy melting steel, east'n Pa.	15.00	15.25	17.00	13.50
Heavy melting steel, Chgo.	14.25	14.15	16.50	11.50
No. 1 wrought eastern Pa.	20.00	19.75	22.75	15.00
No. 1 wrought, Chgo.	15.25	14.00	16.35	10.12
Rerolling rails, Chgo.	15.50	15.70	17.25	11.75
Car wheels, Chgo.	12.00	12.25	13.15	11.40

(For Additional Prices See Page 392.)

Active Buying of Basic Pig Iron

Melters in St. Louis Territory Place Large Orders—Republic Iron and Steel Buys Bessemer and Basic—Scarcity of Iron Already Apparent

Chicago, Aug. 22.—After a long period of apathy on the part of pig iron users who obtain their supply from this territory, inquiry and selling have been renewed.

The most marked feature has been large selling of basic iron for delivery during last half and first half, most of this being for use in the St. Louis district. The Scullin Steel Co. is the largest buyer, having taken 30,000 tons, equally divided between northern and southern stacks. Commonwealth Steel Co. is said to have bought 10,000 tons, part of what will be furnished from Chicago stacks, and the Laclede Steel Co. has taken 5,000 tons of northern basic, while the Grand Crossing Tack Co. has bought 5,000 tons of southern basic.

Some inquiry for basic still remains unsatisfied and further sales probably will be made. A southern Wisconsin manufacturer is in the market for 5,000 tons. A steel manufacturer in this territory recently inquired on 10,000 tons of basic, but later withdrew the inquiry. The possible shortage of ore before the close of navigation is said to have been responsible for this.

Entry of the stack operated by the Mississippi Valley Iron Co. at St Louis is adding a new factor to the local market. This stack is in blast, using ore from the Mississippi ranges, which is transported by rail. It is too early to judge yet how much effect this will have on the market. It is understood some of the basic tonnage recently sold was taken by this interest. Melters of foundry and malleable iron are not inquiring either for last half or first half. Apparently they have nearly enough for the present and do not believe prices will be much higher during first half.

Negotiations for bessemer iron for export continue and a number of tonnages are expected to be closed shortly.

Southern iron is somewhat more active and prices appear firmer. Resale iron is said to be available at $14, Birmingham, for last half and $14.50 Birmingham, for first half. Furnaces are asking 50 cents per ton higher. One large interest is asking $14, Birmingham, for third quarter, $14.50 for last quarter and $15 for first half.

One stack of the Illinois Steel Co. at Milwaukee has been blown out for relining and will not be in blast again until late in September.

Large Basic Sales Made

Cincinnati, Aug. 21.—The Andrews Steel Co., Newport, Ky., has closed for 20,000 tons of basic iron for last quarter and first half shipment at a price reported to be $18.50, delivered for northern iron. This is surprising to the market, as southern Ohio stacks are all holding at $18, furnace, for basic iron, or $19.26, delivered, Newport, Ky. It is probable that part of this purchase was southern basic at slightly below $15, furnace, or around $17.90, delivered, which would make the average price for southern and northern iron around $18.50, delivered. The Whitaker-Glessner Co., Portsmouth, O., has purchased an additional 18,000 tons of basic iron at around $18.53, delivered, for Ironton makes. The American Rolling Mill Co., Middletown, O., has taken 40,000 tons of basic iron, most of which will come from Columbus, O., at a figure reported to be $19.05, delivered. The Scullin Steel Co., St. Louis, has purchased 20,000 tons of basic iron divided between southern and Chicago stacks. The Commonwealth Steel Co., St. Louis, and the Kokomo Steel Co., Kokomo, Ind., are both feeling the market, and may buy around 20,000 tons each in the near future. Recent sales also include 2,000 tons of charcoal iron to Michigan users for the last quarter of this year.

No demand is out for foundry iron for the last half of this year, but light inquiries for the first half of

(For complete prices see page 392.)

1917 are beginning to come into the market, the tonnages asked for seldom being over a few hundred tons each. Southern No. 2 foundry iron is quoted by Tennessee makers from $13.50 to $14.50, Birmingham basis, for delivery up until June, 1917. Alabama furnaces are asking from $14 to $15 for the same delivery. Southern Ohio No. 2 foundry iron is quoted at $19, Ironton basis, for 1916 and the first half of 1917.

Heavy Inquiries, Sales Larger

Birmingham, Ala., Aug. 22.—There has been considerable activity in pig iron circles during the past week. Inquiries have been heavy, and the total sales larger than for some weeks previous. Between 10,000 and 15,000 tons were sold. Prices ranged from $14.50 per ton, Birmingham, to $15 per ton for immediate and extended deliveries. Of this tonnage one large block was sold—the remainder being one and two carload lots to 150 and 200-ton lots. Some foreign delivery iron was sold, but the bulk of the business was for domestic use, and principally for delivery to Pacific coast territory. The different furnace interests throughout the district have been exceptionally busy in shipping iron, but the pronounced car shortage has been a serious detriment. A thorough canvass of the foundry situation in the Birmingham district and contiguous manufacturing territory reveals the fact that all of them are running on at least an average of 85 per cent full time and melting at the rate of full capacity notwithstanding the fact that the demand for the manufactured products is far from being normal. The anticipated railroad strike and near approach to time of proposed advance in certain rates to the Pacific coast have created an unprecedented demand for shipment of material already on the books. In addition to advance in raw material rates to furnace plants, the railroads have put the weights of ore and limestone on the basis of net ton instead of gross ton. These advances will increase the cost of production of iron from 30c to 35c per ton.

Stocks Unusually Low

Philadelphia, Aug. 21. — Coincident with the broadening activity in the pig iron market in this district, a more general appreciation among both buyers and sellers of the remarkably low condition of merchant furnace stocks in the east has come about. Merchant stocks of the Eastern Pig Iron Association now are the smallest ever known, totaling about 50,000 tons, of which about 30,000 tons are being held by one steel works-seller as an insurance while the remainder is distributed among 15 or 20 furnaces. This showing is all the more surprising in view of the fact that many foundry melters have been holding up shipments due to labor shortages. The market appears very well established under such fundamental conditions, but while new business is growing, it has not been of sufficient volume to cause a general rise in prices. Basic is one of the grades which has taken a turn for the better, and following a sale of 6,000 tons to a Phoenixville, Pa., consumer for last quarter at $19, delivered, a minimum of $19.50 now seems to be generally quoted. Some outstanding quotations of $19, delivered, have been withdrawn. A Cumberland, Md., consumer bought 1,000 tons of spot basic from a western Pennsylvania maker at prevailing furnace quotations. An 11,000-ton lot, another for 500 tons and some indefinite negotiations remain in the market. There is considerable sounding out of the low phosphorus iron market for first half delivery by domestic consumers, in addition to the constant and liberal demand for export, principally from Italy and Canada, but makers are deliberate in quoting, because their outputs are sold ahead for months. Prices are held at $30 to $32, furnace, depending on quality. One eastern maker of malleable is in the market for several thousand tons of this grade to fill obligations with his customers, but is having trouble to get the deliveries wanted. Foundry iron is developing slowly with new business confined to small quantities and prices for northern No. 2X are unchanged at $19.50 to $20, Philadelphia. One eastern Pennsylvania maker has withdrawn $19, furnace, and is quoting $19.50, furnace, for No. 2X. A sale of 500 tons for late this year and early next was made at the higher figure. A Camden pipe shop which has been buying freely of low grade iron for some weeks took 1,500 to 2,000 tons from eastern makers the past week and still is in the market. An iron mill is out for 500 tons of forge. A Reading, Pa., radiator shop wants 500 to 1,000 tons of foundry. The leading Virginia maker has issued a new schedule which extends prevailing prices for this year through the first quarter and half of next year without advance. This lists No. 2X at $18.50, No. 2 plain at $18.25, No. 3 at $18 and No. 4 and forge at $17.75, all at the furnace.

Decided Increase in Sales

Cleveland, Aug. 22.—As showing the very decided increase in activity in the pig iron market, the experience of one Cleveland firm may be cited. This firm has sold this month more than 80,000 tons of pig iron, or about ten times the tonnage sold during all of July. The sales include one of 15,000 tons of bessemer to the Republic Iron & Steel Co. One of the Hubbard stacks is now making bessemer and the other will be put on bessemer Jan. 1. Hence former buyers of Hubbard foundry grades are looking elsewhere to cover for their requirements.

Basic Buying Active

St. Louis, Aug. 22.—Sales of pig iron in St. Louis last week were larger than they have been for a long time, and gave the impression that a buying movement of large proportions has started. The Scullin Steel Co. bought 15,000 tons of northern basic and 15,000 tons of southern basic, Thursday, although at the time of the sale it was reported to have been only 20,000 tons. Not all of the iron was bought in St. Louis, and the price is withheld, although it is reported that some shading was done. The Commonwealth Steel Co. purchased 10,000 tons of northern basic, and the Laclede Steel Co., of Alton, Ill., closed for 5,000 tons of northern basic. The National Enameling & Stamping Co. is said to be in the market for quite a tonnage of iron, and an inquiry arrived today from Quincy, Ill., for 100 tons of high silicon iron. A number of small orders were closed last week also.

Southern No. 2 iron is held at $14, Birmingham, for delivery over the remainder of the year, and $15 for first quarter of next year. Northern iron is quoted at $19, Chicago and Ironton furnaces.

Buffalo Sales 50,000 Tons

Buffalo, Aug. 22.—The inquiry that entered the market for large consumers and melters scattered throughout the territory, giving evidence as reported last week that a buying movement had developed ahead of expectations, has resulted in the booking of orders by the Buffalo furnaces for a total of 45,000 to 50,000 tons in the past week, and there remains a large tonnage under negotiation.

There was one inquiry for 14,000 tons, largely foundry grades and one for 10,000 tons of basic. Buffalo furnaces report that the General Electric Co. has covered for its requirements for 1917 and that the International Steam Pump Co. has taken a like course.

There is every indication that the buying has barely begun. With this view of the market one leading producing interest of the Buffalo district has set 30,000 tons as the limit of tonnage it will book in the present movement and then hold off for a matter of 60 days before accepting any further orders, believing that higher prices are due to appear.

Another leading interest reports that within the next 60 days there is due to occur a general scramble for iron.

The orders so far booked and the

(For complete prices see page 392.)

tonnages remaining under negotiation are largely for foundry grades, for malleable, for basic, for bessemer and some of the special grades.

Re-sale iron that has been a factor throughout the year as a source of available tonnage in the Buffalo market has been disposed of to such an extent that there is not enough remaining to satisfy a single one of the larger orders booked during the week, to say nothing of taking care of any general demand for prompt shipment iron.

Another strengthening feature of the market, in addition to the disappearance of the re-sale iron, is the fact that the steel makers operating in excess of their own furnace capacities, are compelled to turn to the merchant stacks for an increasing volume of steelmaking iron, thus reducing the availability of these stacks to meet the needs of the foundry interests. Mills that have heretofore been classed as sellers of iron are now entering the market as buyers.

Stronger in the East

New York, Aug. 22.—A heavy tonnage of iron for domestic buyers totaling not less than 75,000 to 100,000 which has been considerably augmented during the week, is before sellers in this district and this is giving the market a stronger and more expectant tone. While several round lot transactions have been closed, only a moderate portion of the inquiries has been converted into orders. Large buyers show some difference of policy as to the rapidity with which they are distributing orders. The General Electric Co. closed against an inquiry for 13,000 tons of foundry, malleable and low phosphorus grades for its various plants for first half, after having had it in circulation only two or three days. Alabama furnaces received a considerable part of the business for New England plants. The Hewitt Steel Corporation, Newark, N. J., bought 11,000 tons of eastern Pennsylvania basic for last quarter, paying $19.50, delivered, which represents an advance of 50 cents over last week in this grade. This buyer first received a quotation of $19, delivered, but this was withdrawn. The 35,000 to 40,000 ton inquiry of the Worthington Pump & Machinery Corporation remains unclosed. A Depew, N. Y., steel maker is out for 10,000 tons of basic and 2,000 to 3,000 tons of low phosphorus for last half. A Dover, N. J., stove maker wants 5,000 tons of Nos. 2X and 2 plain, first half; a radiator company 1,000 tons of the same grades and the New York Central Railroad 750 tons of spot foundry for Frankfort, N. Y. Small inquiries are more numerous. The malleable syndicate negotiations still are going on. Foundry iron prices have not been advanced and $19.75 to $20, tidewater, for No. 2X still is quoted. Resale iron continues to come out at concessions, buyers having been offered No. 2X at under $19, delivered, this district. At Buffalo, there is $18.50 resale iron with some furnaces now holding No. 2X at $19.25 to $19.50 for next year. Export inquiry is heavy, but sales are few, apparently being due to the still rising freight market. From the south to the Mediterranean, $35 to $40 now is quoted. Alabama No. 2 for export now is bringing $14.25 to $14.50, Birmingham. Tennessee furnaces have sold several thousand tons of foundry to Italy. A new inquiry for France issued today asks for 5,000 to 10,000 tons of special bessemer.

Steelmaking Iron Scarce

Pittsburgh, Aug. 22.—It has developed during the past few days that heavy purchases of basic and bessemer iron have been made during the period of inactivity covering the past six months, resulting in a condition whereby some consumers, now in the market for large tonnages, are unable to have their wants supplied. It is stated on good authority that furnaces in the valley and in the Greater Pittsburgh district will be unable to take orders for new business except for delivery in and after the first quarter of 1917.

The Republic Iron & Steel Co., which has been in the market for about 30,000 tons of bessemer and basic, has been able to secure 15,000 tons of bessemer from a Cleveland firm, and it is understood has purchased a like amount of basic. It has been more fortunate than the Standard Steel Works Co., the American Steel Foundries and other interests in the market for iron which not yet have been able to find furnaces to take their orders.

Warrants Higher

New York, Aug. 22.—Spot Alabama pig iron warrants during the past week sold 50 cents higher at $14, warehouse for No. 2 soft, and the market has improved both in strength and tone. Last week brought a considerable new inquiry into the market, but this has not been so pronounced during the present week. This better inquiry has brought more offering of awards in some directions and a considerable tonnage of Alabama No. 2 foundry now is offered at $13.50. This appears to be about the minimum. Some of the recent demand has been for export. At least one sale of 2,500 tons was made to a foreign buyer, apparently for Italy.

Harry C. Disston, brother of Henry Disston, founder of Henry Disston & Sons, Inc., Philadelphia, died at his home in Oak Park, near Lansdale, Pa., Aug. 17, aged 49 years.

(For complete prices see page 392.)

Ferro Licenses

Are Still Being Held Up and Situation May Become Serious

New York, Aug. 22.—Granting of licenses for August shipments of ferro-manganese to this country from England still is withheld from makers by the British admiralty and unless these permits are allowed very shortly, imports of this alloy for the present month and during the next several weeks will be at a low ebb. To date, as previously noted, only one August license has been granted by the admiralty to the five or six companies which have been shipping to this country. This amounts to 2,800 tons, but, as has been pointed out, it represents practically a two months' allowance, since this particular maker did not obtain a permit to ship during July. The metal called for by new licenses all is under sale and will be distributed against old contracts. If the present policy of withholding licenses is persisted in by the English admiralty for an extended period, it will bring considerable annoyance and difficulty to consumers in this country, especially of the smaller class, who have not been carrying much stock, and have been relying upon their orders with English makers to be fulfilled without protracted delay. It is scarcely believed in the trade, however, that the English authorities will refuse indefinitely to grant licenses, especially since running contracts are on such an attractive price basis. The English government has been requiring that the makers of ferro-manganese shall have in stock a stipulated amount of ore and smelted metal before exports are allowed. It seems likely that the heavy shipments to this country during June and July have made material inroads into the stocks and that until the latter again are built up, foreign shipments will be restricted.

An interesting development in the ferro-manganese market is that the Carnegie Steel Co. now is offering and selling some of the product of its furnaces which hitherto has been devoted to its own needs. This company and the Steel Corporation in general, it is learned, have large stocks of manganese ore and are regularly receiving liberal shipments from Brazil. A number of small sized sales, which are practically all the market now is offering, have been made at prices which are understood to approximate the going range of $170 to $175, furnace or seaboard. While the market generally has a somewhat firmer tone due to the uncertainty over English shipments, price irregularities still are present. Domestic electrolytic

ferro-manganese in tonnage or carload lots is being offered on the basis of $162.50, eastern seaboard, for either prompt or forward shipment. About 1,000 tons of domestic inquiry in scattering lots and several thousand tons for export remain in the market.

There is one domestic inquiry now current for 1,000 tons of spiegeleisen, but beyond this the market is quiet. Prices are unchanged at a range of from $45 to $50, furnace, for 20 per cent. An eastern Pennsylvania consumer remains in the market for 2,000 tons of 10 per cent bessemer ferrosilicon for all of next year.

Billet Buyers

Are Having Much Trouble in Covering Their Needs

Philadelphia, Aug. 21.—An upward tendency is being maintained in semi-finished material, owing to the fact that practically every steel maker, by reason of the tremendous demand for finished products and for munition forms, could handle considerable tonnage over and above his own make. Whereas any billets or other semi-finished product is offered, it is quickly snapped up. Not less than three eastern Pennsylvania steel makers who have been in the market for a week or two for billets, slabs or ingots for their own purposes have been unable to fill their needs. Buyers of this class find it almost impossible to get quotations. One eastern Pennsylvania producer has made a sale of a good tonnage of open hearth rerolling billets to a regular domestic customer for shipment before and after Jan. 1, at $55, mill, or about $52, Pittsburgh basis. The lowest prices are about $47.50, Philadelphia. Off-sulphur open hearth rerollers have brought $46, Philadelphia, or about $42, Pittsburgh. Forging billets are getting stronger steadily and are on a minimum basis of $65, mill, with leading eastern Pennsylvania makers. Small sales for immediate delivery at $70, mill, are noted. Large inquiry for export are before eastern mills at all times. A new lot just asked for is 20,000 tons of large billets. Another is 4,000 tons of 4 x 4's. Munition makers are in the market freely. A new inquiry for forgings for base parts for large shells put out by an equipment shop here will require from 4,500 to 7,000 tons of steel.

Strong at Youngstown

Youngstown, O., Aug. 22.—The overwhelming demand for semi-finished steel for war uses gives the domestic market sympathetic strength. Despite recent heavy sales of billets, sheet bars and slabs, both for export and to shellmakers in this country, large inquiries are continually being received. While some of this business has gone to Youngstown producers, most of the local mills are practically out of the market. Open hearth stock is especially sought and frequently attracts offers far above ruling quotations. Sheet bar requirements of the sheet mills for the last quarter are engaging the interest of both producers and consumers and there is every indication that prices will be advanced when the sliding scale contract prices are adjusted next month. The third quarter price averages about $39 and developments of the next few weeks will do much to determine what price will rule for the final quarter.

Sheet Bars are Scarce

Pittsburgh, Aug. 22.—The demand for semi-finished material still continues to exceed the capacity of the mills and deliveries over an extended period are necessitated in the future orders that are being booked. The condition of the market was revealed during the week when it was announced that an English buyer, who for four weeks has been endeavoring to secure sheet bars to meet his specifications, has been unable to find mills to accept his orders. Several mills offered 1,000 tons of odds-and-ends in sheet bars, but the English purchaser was unwilling to accept this material.

The demand for billets continues to be strong and is far in advance of the ability of the mills to produce them. The prices for all kinds of semi-finished materials range from $44 to $50, $46 to $47 being the prices most commonly reported. Mills quoting $50 are understood to be sold out and this price is more or less nominal. Several manufacturers, however, predict that actual sales at $50 will be made in the near future.

Will Meet in Birmingham

The Lake Superior Mining Institute will hold its twenty-first annual meeting March 13 to 17, 1917, in Birmingham, Ala., according to an announcement by Secretary A. J. Yungbluth. This meeting was to have been held on the Menominee range this summer, but changes in development in that district since the meeting there in 1911 have been of such minor importance that it was decided to take a trip to the southern mining regions of the country. Decision to hold the meeting in the winter was preferred also since at that time the mining men would be freer than this summer when every effort is being put forth to ship as much ore as possible down the lakes as the boats can handle. The institute members will assemble in Chicago for the trip south, and will travel in a special train over the Queen & Crescent route from that city to Birmingham and return. It is proposed to spend a day at Chattanooga for sight-seeing with probably some other stops. The institute council has voted the sum of $1,000 to assist in defraying the expenses of the trip.

(*For complete prices see page* 392.)

Benzol Prices

And Also Those of Toluol are Still Uncertain as to Contracts

New York, Aug. 22.—Determining developments still have been lacking the past week in the market for principal coke oven by-products, especially those required for the manufacture of high explosives. The producers of toluol and benzol have not reached as yet a price basis with the manufacturers of trinitrotoluol and picric acid, as a prelude to the closing by the latter of large contracts for these high explosives with foreign governments. Until these three-sided negotiations have reached a conclusive point, contract prices on both toluol and pure benzol will remain unfixed. Occasional sales of spot product continue to be made. Since these in a number of cases are resale propositions, the prices vary. In toluol, they have been around $4 per gallon, while in pure benzol a few carloads still are offered over a range of from 62c to 65c per gallon. The solvent naphtha market shows more business moving, as offerings are more plentiful. The prices are unchanged.

There is an active export inquiry for sulphate of ammonia aggregating from 6,000 to 7,000 tons, including one proposition of 2,500 tons and another of 500 tons, principally for September and October delivery. Cuba and Porto Rico are inquiring and there also has been some overseas demand. Since leading American producers have their output so largely engaged by reason of recent contracts, they are unable to take much of this business and in many cases are declining to quote. The market is stronger and both spot and contract sulphate now is quoted at from $3.50 to $3.60 per 100 pounds at tidewater.

The current quotations per gallon at the maker's plant on leading coke oven by-products are as follows:

Pure benzol, spot	$0.62 to .65
Pure benzol, contract	.70
Toluol spot	(market not defined)
Toluol, contract	(market not defined)
Solvent, naphtha, spot	.45
Solvent naphtha, contract	.40

Sulphate of ammonia is $3.50 to $3.60 per 100 pounds at tidewater for spot or nearby delivery.

Plates for Ship Building

Continue to be the Chief Source of Demand in the East —Market Strong Throughout the Country

Philadelphia, Aug. 21.—Marine requirements continue to be the chief source of demand for plates in eastern territory and the market still shows large tonnages being placed or inquired for. A new Chester shipyard now is understood to have closed on a recent inquiry for 6,000 to 8,000 tons for several boats for next year, but still is in the market. The joint buying for first half Gloucester, N. J., and Wilmington, Del., yards of 12,000 tons of two eastern Pennsylvania mills closed two weeks ago and then reported it is now learned has been increased to 20,000 tons out of an original inquiry for 26,000 tons. A Seattle builder is out for 8,000 to 10,000 tons of ship material and other marine inquiries from that section and from the Atlantic coast are reported. There is also in the market a 7,000-ton requirement for a riveted plate line along the Pacific coast. The government has asked for bids Aug. 29 on 3,200 tons of caisson plates for Panama. A Buffalo steel maker is inquiring for 800 tons of steel, including 500 tons of plates for structural needs. The usual large amount of foreign inquiry for plates remains in the market. The delivery position of eastern makers on tank steel continues one of many months on tonnage propositions, but universals, due to the light structural activity, are obtainable within a few weeks. The general report of makers is that output is not up to expectations, due to unsatisfactory labor, weather conditions and other causes. This operates to increase the tension on shipments. Eastern plate prices run from 3.00c to 4.00c, Pittsburgh, depending upon the tonnage, specifications and the buyer.

Railroad Demand Active at Pittsburgh

Pittsburgh, Aug. 22.—Mills in this district will be called upon to fill the requirements of much of the material now being purchased by the railroads to repair rolling stock. It is reported that the carriers have adopted the policy of repairing present equipment in preference to purchasing new cars and this has resulted in an active demand for plates. It is understood that from 15,000 to 20,000 tons of plates for this purpose have been purchased during the past week.

Continue Strong

Chicago, Aug. 22.—No cessation in demand for steel plates has been noted. Large contracts have been placed, mostly for ship building, while car building concerns have also taken a great deal of this form of steel. The leading independent, while well sold up on other forms of steel, still has some capacity on its plate mill and will be able to take on some added business for first half delivery. The quotation is 3.19c, Chicago mill, with prompt delivery taking a premium of $5 to $10 per ton over the mill price. A recent sale of 2,000 tons is characteristic of the demand.

Sold Up Solid

Buffalo, Aug. 22.—A number of the producing interests doing business in this district are sold up solid and are out of the market entirely. Prices are being held rigidly at 3 cents, flat. One mill delivery order booked here during the week for a fair tonnage brought 3.25c.

Shapes for the Trenches

J. P. Morgan & Co. Endeavoring to Place Large Tonnages Heavy Specifications Being Received by Mills

Philadelphia, Aug. 21.—A tremendous tonnage of plain structural shapes of a maximum of not less than 50,000 to 70,000 tons still is being sought for the allies from various mills by J. P. Morgan & Co. The order for 15,000 tons of 5-mill beams placed with a western Pennsylvania independent, as noted a week ago, was a part of the original requirement, which calls for 8,500 tons monthly for the remaining five months of this year and an option on an equal tonnage for the first five months of 1917. Since the beams recently placed are to be shipped in 9-foot lengths, it is thought the steel is wanted for trench purposes. An eastern Pennsylvania mill this week was offered 3,000 to 3,500 tons of 5-inch beams and about 3,000 tons of 2-inch angles of the outstanding

The shape market in the east is showing considerable betterment in tone and in new business. Some of the mills report the heaviest specifications in many months and a number of new orders have been placed by larger fabricators for stock purposes which are to be delivered this year. Apparently buyers have reached the conclusion that their hope of lower prices is not likely to be fulfilled for many months and that they had better go ahead and place their orders. Prices with eastern mills are stronger and one large maker who has been doing 2.50c, Pittsburgh, or 2.659c, Philadelphia, to the preferred trade advanced this week to a minimum of 2.60c, Pittsburgh. Other eastern mills are quoting 2.75c, Pittsburgh or mill, depending upon whether the destination is east or west. The Southern railway has placed one bridge, 1,500 tons, of the five recently asked, weighing about 7,000 tons. A new Baltimore hotel will take 1,500 to 2,000 tons.

Inquiries from the East

Pittsburgh, Aug. 22.—Although there is little activity in local building projects, an encouraging amount of prospective business is predicted in the east. Specifications for shapes for New York tunnel and elevated railways, which were withdrawn from bidders several months ago, will soon be offered again. The two notable exceptions to the present listlessness of structural building operations are furnished by the offering of plans for the Arlington hotel, Washington, and the Southern hotel, Baltimore. Inquiries for structural material for bridges are light. The policy pursued by the railroads, which calls for the repairing of existing rolling stock, rather than the purchase of new cars, has resulted in the purchase of fair-sized tonnages of shapes. The Pennsylvania railroad is reported to have taken 4,000 tons of structural material for car repairs.

Demand Better

Chicago, Aug. 22.—While demand for structural shapes continues to be characterized mostly by small tonnages, a few larger lots have been contracted in the west recently. The Burlington railroad has taken 1,500 tons from the American Bridge Co. for bridge work and an Arizona copper company has taken 1,000 tons for buildings. A foundry building for Kling Brothers, involving 456 tons has also been placed.

Quotations remain firm at 2.79c, Chicago mill.

Deliveries Far Delayed

Buffalo, Aug. 22.—Mills and agencies report that the excessive hot weather has curtailed production to a great extent during the current month; that deliveries on larger sizes are extended well through first quarter of 1917 and that on the smaller sizes the producers are booked practically solid so that orders taken now would not be available before the end of the second quarter of

(*For complete prices see page* 392.)

the new year. Inquiries are more numerous that were apparent a month ago and consumers are going from mill to mill with their orders endeavoring to secure deliveries at much earlier dates for urgent needs.

Deliveries Long Delayed

Cleveland, Aug. 22.—Several companies in northern Ohio which delayed making contracts for plant additions are now finding that they will be unable to obtain delivery of structural steel in less than five or six months. One Akron company which finds itself in this situation has decided to adopt concrete construction and is now trying to place orders for trusses for the roof of the proposed building. Another Akron company will proceed according to its original plans, but the construction of the new building will be delayed a number of months beyond the date set for its completion.

Many New Projects

New York, Aug. 22.—A large tonnage of new structural projects now is coming or is being placed in this territory, as buyers apparently have reached the conclusion that they have nothing to gain in prices for many months by holding off. This applies particularly to apartment house construction in the metropolis and a number of jobs of this speculative character are being awarded. The conspicuous feature of the market is the large number of small undertakings that are appearing for bids. This is taken as evidence that buyers feel they can obtain better quotations and deliveries where the steel requirements are lighter. Some large tonnages of plain shapes for export have continued under negotiations and the Steel Corporation has made a sale of 5,000 tons of angles to France. Plain material prices are hardening on the new basis of 2.60c, Pittsburgh, or 2.769c, New York. Some quotations of 2.50c, Pittsburgh, still are outstanding, but practically none of the mills now are quoting a new price on that basis. Fabricated prices are stronger as the plain material base moves up and $85 to $90, erected, is a commoner spread, although some attractive business lately has gone at $82, erected.

CONTRACTS AWARDED.

C. B. & Q. R. R. Company — various bridges, 1,478 tons to American Bridge Co.

Arizona Hercules Copper Co., buildings at Ray, Ariz., 1,031 tons, to El Paso Bridge & Iron Co.

Kling Bros. Engineering Works, foundry building, Chicago, 456 tons, to South Halsted Street Iron Works.

Y. M. C. A. building at Troy, N. Y., 300 tons, to the Eastern Bridge & Structural Co.

Montana Power Co., penstocks for Holter development, Holter, Mont., 362 tons, to Minneapolis Steel & Machinery Co.

Power house for the American Gas & Electric Co., Waterloo, Ia., 500 tons, to the Lackawanna Bridge Co.

Locomotive shops at East Deerfield, Mass., for the Boston & Maine R. R., 325 tons, to the American Bridge Co.

Bridge work for the Boston & Maine Railroad, 150 tons, to the Phoenix Bridge Co.

Extension to the plant of the Williamsport Wire Rope Co., Williamsport, Pa., 325 tons to the American Bridge Co.

Bridge for the Baltimore & Ohio Railroad at Defiance, O., 275 tons to the American Bridge Co.

Bridges for the Grand Trunk Railroad, 200 tons, to the American Bridge Co.

Seneca River bridge for the Southern Railway, 1,500 tons to the McClintic-Marshall Co.

Herzog apartments, Seventy-second street and West End avenue, and 64 East Eighty-sixth street, New York City, 600 to 700 tons each, to the Hinkle Iron Works.

Steel work for the warehouse for the City of New York, on Blackwells Island, 1,200 tons to the Bethlehem Steel Bridge Corporation.

CONTRACTS PENDING.

Norfolk navy yard, 4,200 tons; bids being taken.

Southern hotel, Baltimore, 2,500 tons; bids being taken.

New York Public Service Commission, structural steel for subway and elevated railway work, 3,300 tons; bids to be taken soon.

Panama Canal, shapes for caissons, 3,000 tons; bids being taken.

Plant work in the southwest for the American Smelting & Refining Co., 1,000 tons bids being taken.

Shops for the Grand Trunk Railroad at Port Huron, Mich., 750 tons, bids being taken.

Buildings for the Lehigh Valley Railroad at Manchester, N. Y., 600 tons, bids being taken.

Highway bridges in North Carolina to replace flood damage, 500 tons, bids being taken.

Buildings for the eastern plants of the Worthington Pump & Machinery Corporation, 325 tons, bids being taken.

Ditson office building, Boston, 400 tons, bids being taken.

Power station for the Queensboro Gas & Electric Co., New York City, 200 tons, bids being taken.

Bridge work for the Philadelphia & Reading, 125 tons, bids being taken.

Apartment for West End Co., Eighty-sixth street, New York City, 500 tons, bids being taken.

Bridge work for New York Central Railroad, 500 tons, bids being taken.

Southern Hotel, Baltimore, 1,500 to 2,000 tons, bids being taken.

Customs house, Toronto, 1,500 tons, new bids asked for.

Bessie store, Springfield, Mass., 600 tons, revised bids being taken.

W. A. Stinchcomb, county engineer, Cleveland, will receive bids until Sept. 6 for the construction of the subway approaches to the Detroit-Superior bridge which is being erected in Cleveland. The approaches will be constructed of reinforced concrete and steel. The estimated tonnages of steel required amount to 1,075 tons of steel reinforcing bars and 5 tons of structural steel.

Iroquois to Build Plant

To Make Bessemer Steel—Output to be Taken Largely by the Mark Mfg. Co.

Chicago, Aug. 22.—Manufacture of bessemer steel ingots by the Iroquois Iron Co. at its plant in South Chicago will be undertaken on completion of a converter plant on which construction has just been started. It is believed it will be ready to turn out ingots about Dec. 1.

The new steelmaking equipment is to consist of a 1,000-ton mixer and a 15-ton bessemer converter, which will be housed in an extension of the pig casting machine building at the new plant.

This addition to its facilities is designed by the Iroquois Iron Co. to make it possible to utilize part of its pig iron by converting it into steel ingots which will be sold in the open market whenever conditions warrant. It is believed that the close alliance existing between the iron company and the Mark Mfg. Co., which is building a steel plant at Indiana Harbor, will result in most of the steel output being taken by the latter until a blast furnace has been constructed at Indiana Harbor.

A pig casting machine is being built in connection with the two older stacks to provide for chill cast pigs instead of sand cast, which have been the rule heretofore.

As announced some weeks ago, the Iroquois Iron Co. will build a fifth stack when prices of materials have receded somewhat from the present high level. The location of the new stack has not yet been decided.

Piston Ring Co. Additions

The Piston Ring Co., Muskegon Heights, Mich., is completing a new machine shop and foundry building at its plant at Muskegon Heights. The new building will be a 4-story structure of reinforced concrete and steel and will have a floor space of 34,000 feet. The foundry is in connection with the machine shop and will have a capacity of 100,000 piston ring castings a day. The machinery equipment is now being installed. The new building was erected by the National Construction Co., of Detroit.

(For complete prices see page 392.)

Sheet Market is Stronger

More Activity in Black Sheets and Tin Mill Sizes Are Hard to Get—Automobile Builders Eager to Buy

Youngstown, O., Aug. 22.—The sheet market continues to reveal greater strength. This is true particularly of light gage black sheets, which have been the laggards during the past two years. This strength is partly in wider observance of a 3c minimum, partly in the confidence of the sheetmakers that prices will shortly be advanced and partly in the greater volume of inquiry.

Black sheets, No. 28 gage base, are being held more firmly at 3c, another mill having advanced its price to that figure this week. One lot of 250 tons was sold a few days ago at 3.25c. On the other hand, some mills are still taking on business at a price below 3c, and on material out of stock this figure could easily be shaded. The renewed demand is of a general character. Export inquiries also are heavier.

The galvanized sheet market continues comparatively active, the tonnage involved being small in comparison with normal times, but large in comparison with that moving in recent months. Prices are extremely irregular, quotations from different mills varying sometimes from $6 to $8 a ton. For instance, one sale was made this week at 4.05c, while at the same time another mill is refusing to sell below 4.45c. The bulk of the tonnage is moving between 4.25c to 4.40c, with 4.30c representing the average quotation.

Blue annealed sheets continue comparatively quiet. Most of the mills are well fortified with orders for this grade and little new business is moving. Some additional capacity has recently come in and No. 10 gage is now held generally at 3c. Prices on this grade have relaxed from those ruling some months ago, when 3.25c and 3.35c was paid rather freely.

Continued hot weather has seriously hampered mill operations. One plant in this district was forced to suspend most of its mills yesterday afternoon, while others ran far below capacity. The output has been curtailed by these conditions and deliveries further delayed.

The confidence of the sheet mills in a nearby advance in prices rests largely on the stronger steel market, improved demand for sheets and mounting costs. As the time approaches for adjustment of fourth quarter contract prices on sheet bars, it seems inevitable that another advance will be made by the steel producers. Sheetmakers point out that present prices for sheets closely approximate the high cost line brought about by higher prices for labor and materials and insist that further advances in cost will have to be offset by increased prices for their finished products.

Sheet Market Variable

Chicago, Aug. 22.—While other finished steel products are strong and quotations are steady the sheet market does not reflect the same strength. Lack of demand by consumers is accounted responsible for this and while sheet bars now being rolled more than was the case the earlier part of the year, sheet makers are unable to advance prices correspondingly.

No. 28 gage black sheets are obtainable at 2.04c to 3.19c, Chicago, while No. 10 gage blue annealed are being quoted at 3.09c to 3.24c, Chicago. The wide spread on blue annealed marks the differential between narrow and wide widths, the latter commanding a premium.

No. 28 gage galvanized are being held at 4.44c, Chicago, while warehouses are willing to take tonnages at 4.65c to 4.75c for No. 28 gage, according to the size and desirability of the order.

Want Sheets Abroad

Philadelphia, Aug. 21.—Some large export tonnages have been offered the past week to makers of blue-annealed sheets in eastern Pennsylvania. One of these and the larger business called for the material for steel drums and containers; the other evidently was for shelter purposes for the trenches of belligerents. The sheet market, while it has shown a good demand, has not reflected a heavy buying such as is to be noted in other products. There is very little buying for next year at this time. Prices range from 3c to 3.50c, Pittsburgh, for No. 10 gage blue-annealed, but continued concessions by some mills are reported.

Books Not Yet Opened

Pittsburgh, Aug. 22.—The sheet market in the Pittsburgh district is featured by the refusal of manufacturers to open their books to the builders of automobiles, who are insistently demanding that their orders for the first half of 1917 be taken. Sheet men claim that under present uncertain conditions of the market, it is unwise to book business for the future. It is understood that, in a month or six weeks, when this business will be considered, the output of the mills will necessarily be allotted to the various consumers on a percentage basis, according to the relative requirements of the purchasers.

The demand for blue annealed sheets for both domestic and export trade is extremely heavy at prices ranging from 3c to 3.25c. The reported sales of blue annealed sheets at prices slightly below these figures are due, it is said, to the fact that some of the mills ordinarily engaged in the rolling of black sheets, have been turning out the smaller sizes of blue annealed. Black sheets are being sold at 2.85c and 2.90c, but it is commonly understood that the advanced prices of semi-finished materials shortly will be reflected in higher prices of sheets. Galvanized sheets are selling at 4.25c and 4.30c.

Shortage of Tin Mill Sizes

Cleveland, Aug. 22.—The demand for sheets has improved and there is a shortage of tin mill sizes for which the demand is active. Some of the largest buyers of tin plate are having difficulty in covering for their requirements. In some cases, the mills are willing to contract for the requirements of desirable customers for the first quarter of next year, but are not willing to name a price, which is to be determined later. Prices of blue-annealed and black sheets are firmer at warehouses.

Warehouse prices of galvanized sheets have been cut sharply and sales are now being made at 4.30c to 4.60c, compared with recent quotations of 5.25c. The largest jobbing houses are not now selling galvanized sheets, as their stocks are exhausted.

Good Demand for Tin Plate

Pittsburgh, Aug. 22.—The tin plate market is booked by an encouraging volume of business, for both domestic and foreign consumption. Inquiries for export have fallen off to a slight extent, due, it is said, to the fact that large buyers bought heavily early in the year. There is a wide range in prices, due to the fact that some manufacturers are willing to shade the nominal price of $6 to new customers. In cases of this kind, prices as low as $5.50 are reported, but on the other hand, plates for export are bringing as high as $6.25.

A syndicate has purchased a parcel of land with a 50-foot frontage on Carnegie avenue, Cleveland, from former Judge Clucas W. Collister at a cost of $25,000, and will erect a building to be leased to the Bondy Mfg. Co., manufacturer of auto tops, for a term of 20 years.

(*For complete prices see page* 392.)

Bars for Shell Making

Are Being Held at High Prices—Demand From Domestic Buyers Active—Deliveries Slow

Pittsburgh, Aug. 22.—Manufacturers of munitions both in this country and abroad are still asking for large tonnages of steel bars. It is almost impossible to estimate the amount of business involved at the present time, but it is generally agreed that the demand is far in excess of the capacity of the mills. Rounds for shell steel are held at a range of from 3.75c to 4c per pound, although it is reported that an order involving some 43,000 tons was taken in the past few days at a price slightly below this minimum.

Many sales in the domestic market have been reported at the price established when the increases went into effect several weeks ago. Iron bars are still held at 2.65c, which is the minimum price.

Willing to Make Contracts

Philadelphia, Aug. 21.—Some buyers of steel bars still manifest their willingness to place future contracts at prevailing prices, but they are disposed to take the situation more calmly than when the recent advances were announced. The problem of makers is to take care of their customers, since, as a rule, they are not promising deliveries under six to eight months and sometimes not then. Indications grow that the contracting movement at 2.50c, Pittsburgh, at the time of the last $2 advance was very liberal. Now the mills invariably are quoting 2.60c, Pittsburgh. Specifications are coming out in larger volume. Several unclosed lots of shell rounds remain in the market. The railroads continue to show more interest in their bar requirements and the Virginian now is inquiring for 300 to 350 tons for this year.

Steel Bars Are Tighter

Chicago, Aug. 22.—The only change in the situation as to steel bars is a tightening of conditions and increasing difficulty in placing contracts for this material. The leading interest has practically nothing to offer for delivery before July 1 of next year and the leading independent is in practically the same condition on bars.

A large tonnage has been booked within past few days, as domestic consumers have finally seen that they must cover their requirements for first half or run the risk of being unable to obtain material. Large sellers indicate that all regular customers have been cared for in a conservative way, including agricultural implement makers. The latter took smaller tonnages than usual, contracting for as much as they believed they can use under present price conditions. This business was placed at 2.69c, Chicago mill, as it was under consideration before the recent advance of $2 per ton.

Most business for first half delivery has been sold under the new contracts which contain a clause making them irrevocable, calling for actual delivery of the tonnage, at the price agreed upon, regardless of the later course of the market.

Hard steel bars rerolled from rails are firm at 2.50c, Chicago mill, and demand is excellent. Most mills have a comfortable book of orders and with new business being taken steadily, full operation through the remainder of the year is assured. No indication of a change in price is evident and the present quotation seems likely to remain in force for some time. Premiums are being obtained on a few small sizes of bars, which are in strong demand.

Bar Iron Steady

Chicago, Aug. 22. — Makers of iron bars are selling steadily at a moderate rate at 2.35c, Chicago mill. Some mills have taken sufficient contracts to practically cover their output for the remainder of the year, while others have limited their contracts more closely and can take on further orders for delivery during last quarter.

Occasional transactions are made on a basis of 2.50c, Chicago mill, but usually there is some special consideration and the market in general is not so high.

Shafting Strong

Pittsburgh, Aug. 22.—There continues to be a strong demand for shafting, orders for this material having been accepted for delivery far in advance. In spite of the increased costs of bars, prices continue to be quoted at 15 to 20 per cent off list.

Bands and Hoops

Pittsburgh, Aug. 22.—The market for steel bands and hoops seems to be extremely firm and the prevailing prices represent the maximum quoted a week ago, the minimum quotations having disappeared. There is an active demand for both products and in the majority of cases, mills will not promise shipments in less than eight or 10 months. Very little tonnage is being sold for prompt delivery and premium prices are recorded in some instances.

(For complete prices see page 392.)

Cast Iron Pipe

Plants in the South Extremely Busy—Demand Active

Birmingham, Ala., Aug. 22.—The cast iron pipe manufacturers have been bending their efforts towards meeting the urgent demands made by customers for business already in hand—due to present disturbed labor conditions and proposed advance in freight rates. This situation has also stimulated some new buying, but the aggregate tonnage is comparatively small. All of the plants in the Birmingham district are running full time, and the plant of the Lynchburg plant at Anniston is being looked over, and preparations are being made to put it in operation at an early date. Prices are unchanged.

Buy Some Cast Pipe

Chicago, Aug. 22. — Unusual quiet marks the cast iron pipe market, although one or two fairly large inquiries are being considered. Nothing of importance was closed within the past week.

Bids were to be opened August 22 at Arnold, Nebraska, on 125 tons and figures will be taken August 30 at Hammond, Ind., on 1,300 tons and at St. Louis, September 1 on 1,800 tons.

Few Public Lettings

New York, Aug. 22.—An award of 1,600 tons of 6-inch to 30-inch of Richmond, Va., has been made to the Lynchburgh Foundry Co. James McAvoy has the general contract for the work in the Borough of Richmond requiring 170 tons of 12-inch. East View, N. Y., is in the market for 500 tons of 4-inch to 10-inch. Public lettings continue very few and private buying is only fair. There is a very heavy demand for flanged work, however, and shops are behind in their deliveries. Pipe prices are firm and in view of the stronger condition of pig iron there is talk that further advances are likely.

Warehouses Busy

Cincinnati, Aug. 22. — Warehouse prices are steady and unchanged. The market for building materials is strong. Demand is heavy for twisted reinforcing bars and light structurals. Cold rolled bars are quoted at 10 plus the list price, hot rolled bars from 3.20c to 3.75c, and shapes and plates from 3.20c to 3.50c. Galvanized sheets No. 28 gauge, are quoted at 5.25c. All of the above prices are f. o. b., warehouse, Cincinnati.

Wooden Cars

Are Being Ordered on Account of the High Price of Steel

New York, Aug. 22.—Car buying is more active, but it is significant that it is confined to the wooden types and practically no all-steel constructions are being ordered because of high cost of material. The New York Central lines which a week ago ordered 2,000 box and automobile types have issued a new inquiry for additional 1,000 box cars. The Western Pacific is in the market for 1,000 box and 150 stock and 100 general service cars. The Delaware & Hudson has withdrawn a recent inquiry for 1,000 hoppers. A number of orders for the repairs of old equipment are being given out. The Western Steel Car & Foundry Co. has received 500 repairs for the Michigan Central and 500 for the Pere Marquette. The Illinois Car & Equipment Co. will repair 500 box cars for the Nickel Plate. Small orders this week include 100 underfames for the Atlantic Coast Line and eight hoppers for the Lorain Steel Co. to the Pressed Steel Car Co., and six diners for the Missouri Pacific to the American Car & Foundry Co., two ore cars for the Robinson Clay Products Co. to the Western Steel Car & Foundry Co. Other requirements include 30 coke for the Bethlehem Steel Co., 25 concentrate for the Utah Copper Co., 50 flats, five tank and 50 underframes for the Continental Car Co., 50 tanks for the Kentucky Refining Co. and 50 quarry cars for the Pittsburgh Limestone Co. The Delaware & Hudson has out five baggage-mail, the Reading five cafe, and the Erie 45 passenger underframes.

Some of the foreign negotiations for equipment are quite active. The much-discussed Russian locomotive order now seems to be actually on the verge of closing. The American Locomotive Co. is expected to received 400 of the 1,000 to be placed, the Baldwin Locomotive Works about one-half that number and the remainder will go to the Lima Locomotive Corporation and a Canadian works. The Italian State Railways are prospective buyers of further cars and have just placed an order for 60 large locomotives with the American Locomotive Co. The French State Railways offer good possibilities for business.

There are indications that some buying for domestic roads of rails for 1918 deliveries may be a development of the near future, possibly before Jan. 1 because of the manner in which the mills are filling up on business into late next year. New export orders recently taken by the Steel Corporation include 10,000 tons for the Cuba Railway and 5,000 tons for the Havana Central. Some domestic roads which bought rails from Canadian mills some time ago and are not getting deliveries continue their efforts to replace this business on this side. The Canadian Pacific railroad which has sought a large tonnage of open-hearth rails in this country now probably will take bessemer.

Moderate Demand Exists

Pittsburgh, Aug. 22.—Purchasers of railroad track material are not figuring as actively in the market at present as was the case earlier in the year. Although there is a moderate volume of business, manufacturers feel that the carriers are buying cautiously. On account of this rather listless attitude, manufacturers have not yet increased the price of spikes to conform with the advanced prices of bars. It is doubtful whether any increase will be announced until there is a stronger demand for this material. There is a moderate demand for rails, but the business of this kind that is being booked further indicates that the roads are using considerable caution in giving out business for their requirements.

Railroads Seeking Material.

Chicago, Aug. 22.—Although railroads apparently placed orders some months ago for track fastenings sufficient for their needs through next year, it appears now that they are in need of considerably more to carry them through. Inquiries for this material are being received by makers in a volume larger than can be cared for and the situation is becoming embarrassing. The same is true of car building material which is desired by car builders to cover sales now pending and recently made.

The steel rail situation is quiet with some small inquiry being received, but without feature. It is understood the Grand Trunk Railroad is inquiring for 20,000 tons of rails for use in Canada, but nothing definite has been done toward closing it in this country.

The car market is quiet, the only important inquiry being 1,000 box cars for the New York Central railroad, which was current last week and has not yet been closed.

New Mills at Warren

The Trumbull Steel Co., Warren, O., will place in operation within a few weeks two new mills for rolling blue annealed sheets and six additional sheet mills. The blue annealed mills will be electrically driven and will be supplemented by a special type annealing furnace, special tables, roller levelers, etc. The company is also building a new cold rolled strip steel department, which will begin operations about the first of the year.

(*For complete prices see page* 392.)

Coke Production

Has Been Curtailed by Labor Shortage and Hot Weather

Pittsburgh, Aug. 22.—Labor conditions and hot weather have served to keep the production of coke down to a level which is comfortably near the demand and as a result there is very little excess coke on the market. Furnace coke is held at $2.85 and during the past week this price has not been shaded. The production of by-product ovens as yet has had no affect upon the demand or price of Connellsville coke. *The Connellsville Courier* reports the production for the week ending Aug. 12 as 403,340 tons, compared with the 394,200 tons for the week before.

Dragging at Cincinnati

Cincinnati, Aug. 22.—The coke market is dragging along with no sales or inquiries for either foundry or furnace grades. Prices are unchanged. Wise County and Pocahontas furnace grades are given from $2.85 to $3.25, ovens, and New River furnace coke is quoted from $3.25 to $3.50, ovens. Pocahontas foundry coke is being held from $3.25 to $3.75, ovens.

Foundry Coke Brighter

Cleveland, Aug. 22.—Prices of foundry coke have advanced about 50 cents, and $3.50 is now the minimum on foundry coke for either prompt or future delivery. The advance is attributed largely to labor shortage in the coke regions and partly to increased demand from foundries. There is a fair amount of buying.

Steel Ingots

May be Sold by the Leading Independent in Chicago District

Chicago, Aug. 22.—An interesting development on this market is the possibility that steel ingots may be available for sale in the open market within a short time. The leading independent is completing its open hearth furnaces several months in advance of its blooming mill and will be able to make ingots in excess of its capacity for rolling them. This will give an opportunity to sell steel to other mills which have an excess of finishing capacity and which cannot produce sufficient ingots. This will have a tendency to increase the supply of raw steel to the extent of several thousand tons. Negotiations have been under way tentatively for some time and probably steel from this source will be shipped to eastern mills.

As soon as the blooming mill and other finishing equipments are running, the entire ingot capacity will be absorbed and this extra steel will be taken from the market.

Bidding on Shell Steel

Allied Governments in Competition With American Makers of Shells—Very Large Tonnages Still Pending

Despite the heavy tonnages involved in the buying movement of the past few weeks, it is reliably estimated that inquiries for 150,000 tons of shell steel remain unclosed. Whether the interests behind these inquiries will be successful in lining up this tonnage is highly problematical at this time, as many of the steel mills are sold up beyond the delivery date specified. The insistent demands coupled with the apparent shortage of supplies, have brought out higher quotations. The bulk of the tonnage taken recently was sold at 3.50c to 3.75c, while recently offers of 4c have been made and some producers expect 4.25c to be offered shortly. In Cleveland, 18,000 tons have been offered without finding anyone to take the business.

An interesting explanation of present conditions, and one that has never previously been published, shows that the allied governments, particularly England, have been in effect bidding for shell steel against the American firms with which they have contracted for shells. The steel reserves of the allies for manufacturing the smaller sizes of shells are insufficient and must be supplemented by American supplies. On the other hand, the allies are looking to this country for a large share of the heavier shells. As a result, when some American shellmakers have received renewals on old contracts and have endeavored to cover for the steel required, they have found that foreign agents have already bought up heavy tonnages of shell steel. Some of the domestic manufacturers seem certain to be seriously hampered in meeting their contracts through a shortage of steel at the same time that immense tonnages of semi-finished steel are being shipped abroad.

The huge orders placed in recent weeks are a complete refutation of the opinion expressed a few months ago that the allies were approaching a self-contained position in war supplies and would sharply curtail their American purchases. As previously explained, the allies are now making the bulk of their small shells, but are as fully dependent as ever on this country for the large shells. This class of shells involves far greater tonnages. For instance, manufacturers who will now make big shells exclusively, find that their new contracts put them in the market for two or three times as much steel as their old ones.

Clearly indicative of the shortage of shell steel is the heavy purchase in the past few weeks of discards. These discards, owing to the heavy tonnages thrown on the market, sagged in price to $25 and $30 a ton a few weeks ago. It has just developed that 100,000 tons have been sold for export, the allies taking advantage of the relatively low price to increase their steel supplies. Portions of these discards will be used in the finished shell, the rest being remelted.

The shortage of shell steel has also resulted in relaxing some of the stringent requirements of foreign specifications. It is understood that parts of the discards are now being used by shellmakers in this country with the complete approval, of course, of the foreign inspectors. This will aid in relieving the shortage, as the specifications call for as high as 20 and 30 per cent discards.

More Contracts Placed

New York, Aug. 22.—An end to the heavy buying of finished shells, shell steel and parts by European belligerents does not appear yet to be in sight and the past week has brought about the placing of some further large orders of this character. A considerable part of this business has consisted of forgings for large shells, notably 8 and 9.2-inch for deliveries running from November to April and, in some cases, beyond. One important industrial company which received during the week additional contracts of large size has closed with middle western steelmakers for 35,000 to 40,000 tons of steel upon which options had been held. A large eastern steel and shell maker has finally closed a contract for both finished shells and forgings of large diameters for the British amounting to at least several hundred thousand. Another eastern Pennsylvania maker who has been very prominent in the munition traffic has closed a large contract for shell steel for delivery through the greater part of the first half of 1917, which is currently reported to amount to from 100,000 to 125,000 tons. A southern steelmaker closed a 12,000-ton order for forging steel. The Harrisburg Pipe & Pipe Bending Co. has received a new order for 200,000 4.5-inch shell forgings for the British. An eastern locomotive builder is in the market for 30,000 to 50,000 base forgings for shells which will require from 5,000 to 7,000 tons of steel. Domestic munition works have asked steelmakers to protect them on about 16,000 tons of material to cover the awards of shells for the navy upon which the United States government is about to open bids. The Italian government has been inquiring for 19,000 tons of shell steel.

Negotiations for the placing of shell steel and forgings principally, still are being carried on by J. P. Morgan & Co. in behalf of the allied countries. The works which have by past performance demonstrated their capacity for turning out these products are able practically to name the size of their own orders. In the case of some companies, business has been accepted on such a scale that their output will be taken up full to July of next year. On plain shell rounds, the steelmakers continue to obtain from 3.50c to 4c mill, without much trouble.

(For complete prices see page 392.)

Pipe Demand

Is Very Active—Rumor of Inquiry for 450 Miles of 10-inch

Pittsburgh, Aug. 22.—In spite of the rapid drop in the price of crude oil, there is a strong demand for line pipe. During the past week approximately 6,000 tons of 10, 16 and 20-inch pipe were sold for use in West Virginia. The inquiry for 450 miles of 10-inch pipe, reported during the past week, has failed to materialize into orders, so far as can be ascertained in this district. Pipe mills are congested with heavy orders to such an extent that it is doubtful whether the business involved in this rumored inquiry could be accepted without seriously interfering with orders now on hand. There is a strong demand for boiler tubes and all other tubular products, making deliveries necessarily slow. Prices continue at the same level as prevailed last week.

Ore Shipments

Are Going Forward Rapidly—Little Chartering of Vessels

Cleveland, Aug. 22.—In spite of hot weather and some delay caused by a storm at Duluth yesterday, ore shipments are going forward rapidly, and it will not be surprising if the wonderful record of last month is equaled by this month's shipments.

There is some chartering for the carrying of ore for the remainder of this season at $1.00 net, but there has been no further discussion in regard to the carrying charge for next year, and both shippers and vesselmen are inclined to postpone action until conditions develop more fully.

Scrap is Dull

At Chicago and Most Centers—Hopeful Feeling at Buffalo

Chicago, Aug. 22.—Unusual dullness prevails in the scrap iron and steel market in Chicago. Not only are consumers refraining from buying but comparatively little material is coming into the market, probably due to the hot period when gathering was interrupted and partly due to difficulty in obtaining labor to handle and prepare scrap. Some difficulty is being experienced in making deliveries of heavy steel recently sold to the Gary and Indiana Harbor mills, as material has been arriving there faster than it could be cared for.

No railroad lists are now current and material from this source is being offered in much less volume than usual.

Quotations remain nominally unchanged and in the absence of selling it is difficult to determine exact levels.

Heavy Offerings of Turnings

Philadelphia, Aug. 21.—A striking exception to the more buoyant condition in other iron and steel lines, continues to be shown by old material. The general demand does not improve and remains limited, although certain grades, usually specialties, are stronger. One of these is wrought pipe which has risen 50 cents. No. 1 railroad wrought remains in good demand and steel axles are hard to find. The other side of conditions is represented by borings and turnings, which are very heavy and are quoted 50 cents lower. The offerings of turnings especially are heavy and brokers have been able to buy liberal quantities at $7, delivered, this district. The buying of heavy melting steel does not improve.

Light Demand at Pittsburgh

Pittsburgh, Aug. 22.—Dealers in steelmaking scrap are marking time awaiting the development of better conditions in this district. At the present time, most of the mills have an abundance of scrap, due to some extent to the fact that production has been seriously cut down, on account of unfavorable weather conditions. In the absence of actual transactions, prices now quoted are largely nominal. The embargo on the shipment of this kind of material to Corporation plants in the Monongahela valley is still in effect, although some relief has been offered by the action of the company in allowing certain shipments to be reconsigned to the Farrell works. There is practically no demand for bundled sheet scrap, turnings and borings.

Low Price for Turnings

Cincinnati, Aug. 22.—Demand for machine shop turnings has become so quiet that dealers have reduced the price on this material until it is now lower than at any time in the history of the iron and steel scrap market here. This material should be selling at about $7 per net ton, but the price today is from $5 to $5.50 per net ton. Heavy turnings are a little lower, being quoted today from $6 to $6.50 per net ton in comparison with $6.50 to $7 last week. The large surplus of bundled sheet scrap available has caused that material to drop 25c per ton, and is given from $8 to $8.50 per net ton. Heavy melting scrap is quoted from $14.50 to $15 per gross ton, with demand from rolling mills at a minimum.

Hopeful at Buffalo

Buffalo, Aug. 22.—Dealers of the Buffalo district report increasing indications of an early demand for steel making scrap. The mills, it is stated, have been holding off but are expected to come into the market for their needs within the next month or six weeks. Heavy melting steel and the other lines of the list are holding to the prices previously quoted, and the scrap yards continue to show no disposition to dispose of large tonnages at present prices.

There is a large export demand for steel car axles, and while prices have been advanced to $26 to $26.50, the quotations are but nominal in this market, as none are available to any extent and those that are command practically their own price.

Heavy Melting Less Active

Cleveland, Aug. 22.—The activity in heavy melting steel noted in this district last week, due to buying by dealers having orders for shipment to the Carnegie Steel Co. at Munhall, Pa., has diminished considerably, owing to the railroad embargo just imposed on scrap shipments to that point. Lower prices are coming out on borings and turnings in this market, as low as $5.25 having been paid for machine shop turnings, while cast borings have gone at $5.75. Otherwise the Cleveland scrap market is exceedingly quiet. Difficulty in obtaining labor is a factor in the production of scrap, but the same condition prevails at the mills, as a rule, and consequently prices are not strengthened appreciably. Heavy melting steel continues quoted $14.75 to $15.25, Cleveland, and $16 to $16.50, Youngstown.

Improvement in South

Birmingham, Ala., Aug. 22.—The demand for old material has shown considerable improvement within the past week. In addition to some very substantial business having been booked the dealers are buying all the available scrap on the basis of present day prices. Some of the large manufacturing plants refuse to sell their scrap on present market prices, believing that within the next two or three months the price will be considerably higher. The tone of the market is decidedly better, and the large domestic users are taking advantage of contracts as far as possible in advance on present market.

(For complete prices see page 392.)

Dealers Active

St. Louis, Aug. 22.—There seems to be considerable activity among dealers in the scrap market, with what appears to be the main object of accumulating a tonnage regardless of prices paid. The consumers, however, have not entered the market to any appreciable extent, and are only purchasing odd lots, where some concession in price is made. Relaying rails are in great demand and prices are advancing on this commodity each day.

The only offerings before the market this week is a list issued by the M., K. & T., amounting approximately to 1,800 tons.

Better Feeling Prevails

New York, Aug. 22.—A better feeling is showing itself in some quarters of the scrap market, but this has brought about no appreciable increase in the volume of business. Rolling mill grades are showing practicaly the only betterment. Steel axles remain extremely scarce with reported offers of $38, seaboard, for export, and around $32, delivered, for domestic. Dealers who have been searching the market for axles have found practically none obtainable. The heavy offerings of munition turnings, which are suitable for only blast furnace needs are bringing low prices. One western Pennsylvania mill is offering $7, delivered, or about $4.70, this district. Eastern munition works have sold good-sized lots of turnings at $5, at their plants.

Cold Rolled Strip Steel

Pittsburgh, Aug. 22.—Manufacturers of cold rolled strip steel report comparatively heavy business for the past week, most of the orders calling for delivery for the remainder of the year. Contracts recently closed call for good sized tonnages at prices ranging from 6.25c to 7.20c. Although consumers are attempting to place orders for requirements for the first half of 1917, manufacturers have not yet opened their books for delivery after Dec. 31. It is expected that revised extras for special stock will be issued at an early date.

MEN OF THE IRON TRADE

Who they are **Where they are** **What they are doing**

W. A. Barrows Jr., of Brainerd, Minn., has been elected president and general manager of the Thomas Iron Co., Easton, Pa., succeeding Ralph W. Sweetser, who resigned some weeks ago, but who has been continuing to discharge these duties pending the choice of a new executive. The change is effective Aug. 31. Mr. Barrows has had a wide experience both in the selling of iron and in the operation of furnaces. At various times he has been connected with the Mahoning Valley Iron Co., Youngstown, with the Thropp furnaces at Earlston and Saxton, Pa., and with the Shenango Furnace Co. from 1901 to 1908, in charge of furnace and iron ore operations. Since 1908 he has been engaged in iron ore engineering and consultation work.

W. D. Cloos has been elected secretary and treasurer of the Lima Locomotive Corporation, Lima, O.

Helmus B. Wells, secretary, Northwestern Malleable Iron Co., Milwaukee, has returned from Plattsburgh, N. Y., where he spent a month as a private in the citizens' military training camp.

W. H. Williams, treasurer of Gaston, Williams & Wigmore, Inc., New York City, sailed from New York Aug. 17, for Petrograd to study trade conditions.

A. N. Flora, general superintendent in charge of works operations of the Trumbull Steel Co., Warren, O., for several years, has been made general manager of sales.

John G. Tuttle and Lyman B. Comstock have been appointed assistant managers of the Coe Brass branch of the American Brass Co., Torrington, Conn.

Craig Adair, formerly mechanical engineer of the Baldt Steel Co., New Castle, Del., has entered upon his new duties as assistant to the president of the Penn-Seaboard Steel Corporation, Philadelphia.

Otis C. Friend has retired as sales manager of the Mitchell Motors Co., Racine, Wis., to become vice president and general manager of the United Motors Co. of New York, a large eastern distributor of motor cars. The change was effective Aug. 15.

Russell C. Blakeslee, who has been with the Torrington Mfg. Co., Torrington, Conn., for 32 years and for several years its secretary, has resigned to accept a responsible place with the Chase Rolling Mill Co., Waterbury, Conn.

Samuel Karasick, chief inspector of the Remington Arms-Union Metallic Cartridge Co., Bridgeport, Conn., has resigned to devote his time to other business interests. G. S. Radford, advisory engineer at the Remingfon plant, has assumed the duties of chief inspector.

Andrew Carnegie arrived at Bar Harbor, Me., Aug. 20, in his yacht THE SURF, in such a feeble condition that he found it difficult to walk without support. He is on a yachting cruise along the eastern coast. He told friends he was not sick. "I only feel tired," he said. Mr. Carnegie is accompanied by a physician and attendants.

W. A. BARROWS JR.

William D. Manchester, Rocky Hill, Conn., for the past five years manager of the trap rock department of the Edward Balf Co., Hartford, Conn., has resigned and on Sept. 2 will leave with his family for Chuquicamata, Chili, where he will become superintendent of the pulverizing department of the Chili Exploration Co., a branch of the American Smelting & Refining Co.

E. T. Foote, formerly of the New York office of the Cutler-Hammer Mfg. Co., and at one time in the engineering department at its Milwaukee plant, has recently been put in charge of the Boston office, located in the Columbian Life building. Mr. Foote's experience in the engineering department and sales engineering work in New York fit him admirably for his new position.

J. H. Schoenly, a steel man of extended acquaintance in the east, has become connected with the Simonds Mfg. Co., Lockport, N. Y., and will devote his attention to steel plant operations, effective Sept. 1. Mr. Schoenly for many years was with the Philadelphia office of the Lukens Iron & Steel Co. in a sales capacity, and later was manager of the southern sales office of the Phoenix Iron Works at Baltimore. More recently he has been receiver of the Roanoke Bridge Co., Roanoke, Va.

By-Product Plant

Of Youngstown Sheet & Tube Co. Now Operating in Part

The first units of the new by-product coke plant of the Youngstown Sheet & Tube Co., Youngstown, O., are now operating. The entire plant comprises 204 Koppers ovens, and two units or 102 ovens are turning out coke. The first coke was drawn Aug. 17. The combined capacity of all of the ovens will be 65,000 tons a month, sufficient to supply the demands of the Youngstown plant. The company will continue in the open market, however, for supplies for its recently acquired furnaces at Hubbard, formerly owned by the Andrews & Hitchcock Iron Co. The tar produced will be sold direct to the Barrett Mfg. Co., which has erected a new plant at Youngstown, while that concern will act as selling agent for the other by-products, such as benzol, toluol, phenol, etc. Two by-product plants are now operating at Youngstown, the other being that of the Republic Iron & Steel Co. A plant is under construction by the Brier Hill Steel Co.

Enlarging Mill

Further extensions of the plate mill of the Nagle Steel Co., Pottstown, Pa., have been ordered. A contract for the erection of an addition, 40 x 120 feet, has been awarded to E. F. Shoemaker & Co. Other improvements are contemplated.

New Company

With Large Capital Will Operate the American Vanadium Co.

New York, Aug. 23. (By wire.)—Announcement is made of the formation of a new company to take over and operate the American Vanadium Co. under the same title with a capitalization of $13,500,000. The present capitalization of the company is $700,000. Eastern capitalists headed by Harrison Williams, of New York, as syndicate manager, are interested in the new company. Jas. J. Flannery, of Pittsburgh, present president, will become chairman and J. J. Replogle, now vice president and general manager of sales, will be president. The remainder of the organization will be completed this week.

The American Vanadium Co. controls the great bulk of the known vanadium deposits of the world with extensive mines in Peru. The use of this metal in the manufacture of high grade steels has increased greatly in recent years.

Reports are in circulation of a possible merger of the American Locomotive and the Railway Steel Spring, but nothing official has been given out.

Nuts and Bolts

Have Been Advanced — Specifications are Heavy

Pittsburgh, Aug. 22.—The expected increase in the prices of bolts and nuts was announced a few days ago. Prices of carriage and machine bolts and lag screws were announced about 5 per cent and hot pressed square and hexagon nuts 20 cents.

Specifications for nuts and bolts continue to be heavy and orders are being taken on a basis of delivery in six months. There is a good demand for rivets. The prices of rivets were not affected by the increase in bolts and nuts, structural rivets holding firm at 4c and boiler rivets at 4.10c, Pittsburgh.

The prices will be found on page 392.

Increasing Facilities

Reports that the Wilmington Steel Co., a subsidiary of the Midvale Steel & Ordnance Co., has purchased large tracts of ground adjoining its plant at Wilmington, Del., for extensive enlargements are much exaggerated. The company has acquired six or seven lots contiguous to its property and these will be used for rounding out the trackage and yard facilities, which have been inadequate. No new building construction is anticipated. One of the open hearth furnaces and an 18-inch bar mill, which is rolling large rounds, continue in operation at the plant. Two other open hearth furnaces are about ready to be started. It is understood that the company will build a number of houses for its employes in the vicinity of the plant. The Midvale Steel Co., another subsidiary of the Midvale Steel & Ordnance Co., has leased a tract of 8 acres adjoining its plant at Tacony, Pa., which embraces several buildings and the largest of these will be used for office purposes.

Iron for Holland

New York, Aug. 23. (By wire.)—Holland has just placed an order for 1,000 tons of foundry iron with Alabama makers through exporters in this city. Italy also placed a new lot of 500 tons of bessemer. Bessemer prices are around $22.50, New York, and slightly under.

Improvements

Of Varied Character Being Made by Alabama Company

Birmingham, Ala., Aug. 22.—The several furnace, steel and mining interests of the Birmingham and Anniston-Gadsden districts have made, and are today making some substantial improvements. These improvements have been going on in a very quiet way, but a visit to the plants has revealed the fact that they have been on a much larger scale and represent the expenditure of more money than the average public has heard of or has taken into consideration. Practically all these improvements have been made out of earnings, and for this reason little has been heard of same. As an illustration, one furnace company has spent, within the past three months over $100,000 out of current earning account for improvements and betterments in living conditions.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

In an excited and advancing metals market, lead within the past several days displayed more strength than in many weeks. Following an advance in price by the American Smelting & Refining Co. on Aug. 16 from 6c to 6.25c, demand became exceedingly active, both from foreign and domestic sources, particularly the latter. On Aug. 18, the excitement became intense and the Smelting company on that day again raised its asking price ¼c. Prices in the outside market, reflecting the extraordinary demand, also rose rapidly, going to the highest level since July 7, when quotations were ranging around 6.80c, New York.

During the past couple of days, buying has slowed up somewhat. However, the tone of the market continues exceedingly firm, owing chiefly to statistical position of the market and to the further foreign requirements which are expected to develop shortly as the result of the new shrapnel and new small arms cartridge contracts which have been placed here from abroad.

The New York Markets

New York, Aug. 22.—The metal markets, with the exception of aluminum, all displayed great activity last week. Yesterday and today, the demand has flattened out and the markets now are quiet. A heavy business, particularly, was transacted in copper, which metal now is exceedingly scarce for shipment over the next two months. Electrolytic now is quoted as follows: August, 82c, cash; September, 27.50c to 27.75c, cash; October, 27.25c to 27.50c, cash; November and December, 26.50c to 27c, cash. Lake copper is quoted as follows: August, 27c to 27.50c, cash; September, 26.75c to 27c, cash; last quarter, 25.75c to 26.25c, cash. Casting copper is quoted as follows: August 25c to 25.25c, cash; September, 24.75c to 25c, cash.

A great deal of spelter was bought last week, and prices advanced sharply. The producers now are all well sold ahead and are not anxious to sell. This week, however, the market is quiet and today there were some second hand offers at concessions. Prime western now is quoted as follows: Prompt, 9.50c to 9.75c, St. Louis; August, 9.50c to 9.75c; September, 9.37½c to 9.62½c; last quarter, 9.12½c to 9.37½c. Brass special is quoted at 10.25c to 10.75c, St. Louis, for prompt shipment.

A great deal of excitement was reflected in the lead market last week, and among the developments were two advances in price by the American Smelting & Refining Co., which now is quoting 6.50c, New York. Heavy sales were made both to domestic and foreign consumers, and two sales to Russia alone involved 5,000 and 4,000 tons respectively. The outside market is quoted at 6.62½c, St. Louis, and 6.75c, New York. Producers are sold farther ahead than ever before in their history.

The antimony market was exceedingly active last week, and hundreds of tons were sold, so that the large sellers now are not quoting on anything larger than 5-ton lots. Spot antimony is quoted at 14c to 16c, duty paid.

The tin market was featured only by the usual volume of business. Quotations on September to December, inclusive, have been hard to get lately, although limits on August and next January are plentiful. The market is quoted at 38.40c to 38.50c on spot, August, and September, 38.37½c on October, 38.25c on November and 38.12½c on December.

The aluminum market is dull. No. 1 virgin ingots in carload lots are quoted at 58c to 60c for spot shipment, No. 1 remelted at 56c to 58c, and No. 12 alloy at 45c to 47c.

(*For complete prices see page* 392.)

How A Great Railroad Handles Its Scrap

by E. L. Shaner

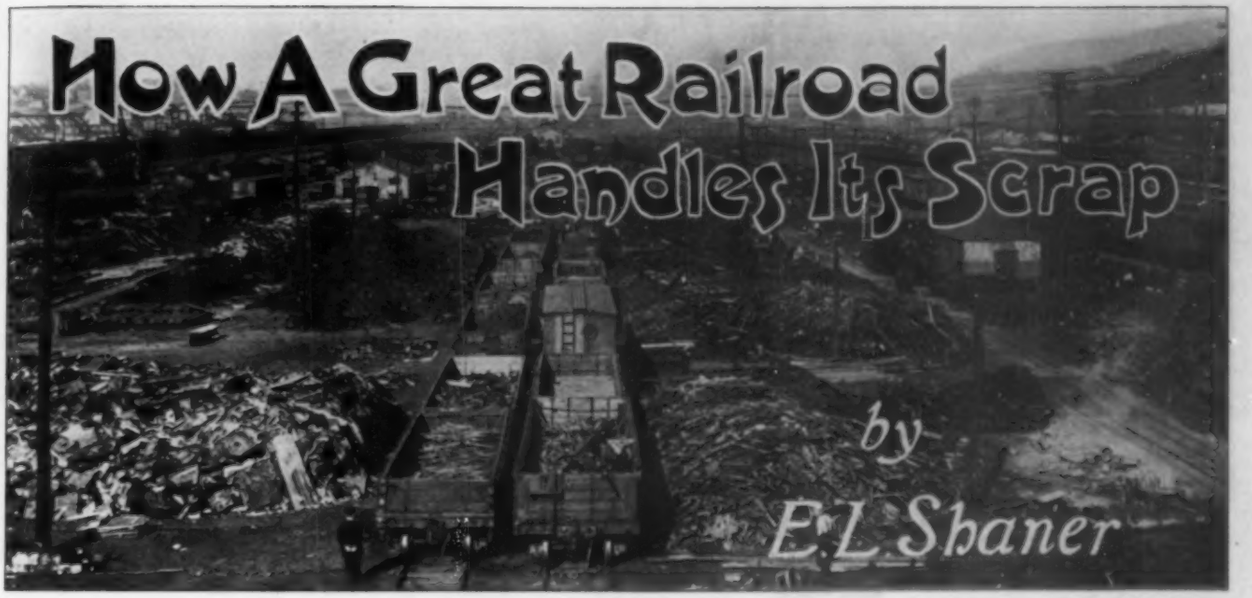

Fig. 1—Altoona metal yard of the Pennsylvania Railroad showing arrangement of tracks and piles of scrapped and reclaimed material

THE pressure of modern competition has forced manufacturers to be on the constant lookout for opportunities to effect economy. This vigilence has resulted in the introduction of scientific methods of management and the organization of systems for the conservation of raw materials. The present popularity of the words "efficiency" and "conservation" testifies to the extent to which business men have carried this campaign. The systematic recovery of second hand materials, however, seems to have received but little attention, notwithstanding the fact that it presents a ready source of revenue.

A good example of what may be accomplished by properly handling used material is furnished by the railroads, known to the public and to congressmen in particular, as the most wasteful of all corporations. This article deals with the methods of the Pennsylvania Railroad Co. in the collection, handling and disposal of scrap.

How the System Works

The old material accumulates at repair shops and yards, and at every place where cars or locomotives are built, repaired or destroyed. From these originating points it is forwarded to central collecting stations, known as metal yards. The material arriving at these yards is weighed and then inspected so that articles of use in repair work may be separated from the scrap. After the serviceable material is recovered, the scrap is sorted according to standard specifications, and is piled up to await disposition. At the end of every month the foreman of each metal yard reports to the purchasing agent the amount of each kind of scrap on hand. The purchasing agent compiles a list from the reports from the various metal yards, and advertises the scrap. When a sale is made, he promptly informs the foremen interested, who load the material and ship it in accordance with the purchaser's instructions.

The Altoona metal yard, shown in Fig. 1, is the largest of the 20 situated on the Pennsylvania lines east of Pittsburgh. It is about a quarter of a mile long and includes six tracks with ample storage and loading space between. The principal piles of scrap are arranged on either side of the double tracks in the center of the yard, as shown in the illustration. The track at the right is

FIG. 2—LOCOMOTIVE CRANE, EQUIPPED WITH MAGNET, LOADING STEEL TURNINGS WHICH HAVE BEEN SOLD. ABOUT 700 POUNDS OF TURNINGS ARE HANDLED AT A LIFT

FIG. 3—BURNING FREIGHT AND CABIN CAR BODIES TO RECOVER THE METAL

Sills, siding and other wood fit for service and which may be removed cheaply is reclaimed. The wood remaining is burned, because its value does not justify tearing it apart. The metal is not sorted but is sold as miscellaneous car scrap

equipped with a third rail to accommodate narrow gage hand trucks which assist in moving articles from one place to another when it is not advisable to use a railroad car for the purpose. The track at the left of the illustration is devoted to old wooden cars which are to be destroyed. At various points in the yard, small buildings, built of wood from old freight cars, house motor driven shears so that metal may be sheared to length without hauling it long distances. One of these shears is shown in Fig. 5. Most of the loading and unloading is accomplished by means of locomotive cranes equipped with magnets, as shown in Fig. 2. Each of the three cranes in use in the yard is self-propelled so that cars may be moved as desired without the necessity of having a yard locomotive in service through the day.

About 100 men are employed in the yard when the railroad is operating on a normal basis. Aside from the inspectors, who are paid on an hourly basis, most of the men work at piece-work rates. Each operation in the weighing, sorting and handling of scrap has been standardized to such an extent that prices have been established for each detail, and the system has been in operation for several years with satisfactory results.

The average accumulation of scrap at the Altoona yard is about 4,000 gross tons. The Pitcairn metal yard, near Pittsburgh ranks second in this respect with a slightly smaller tonnage, and the other yards have monthly averages ranging from that figure down to about 40 gross tons.

Only a part of the material received at the metal yards is sold, because the company has developed means for disposing of many kinds of scrap in its own shops. Mounted wheels, an important item of scrap on any railroad, are in most cases utilized. The wheels are pressed from their axles, and if they are of cast iron, they are sent to the South Altoona foundries of the company where they are charged in the cupola. Fig. 7 shows fragments of broken wheels ready for the cupola. The charge is a car wheel mixture consisting, approximately, of 65 per cent broken scrap cast iron wheels, 5 per cent steel scrap from the metal yards, and 30 per cent pig iron. Rolled steel

FIG. 4 — SUPERVISOR'S WORK TRAIN GANG LOADING PILES OF DISCARDED OR DROPPED MATERIAL FROM CARS AND LOCOMOTIVES. BRAKE SHOES, BRAKE BEAMS, BOLTS, NUTS, AND SMALL CASTINGS ARE JARRED FROM MOVING TRAINS. THE WORK TRAIN MEN MAKE PERIODIC TRIPS TO PICK UP THIS MATERIAL

FIG. 5—MOTOR-DRIVEN SHEARS FOR CUTTING SCRAP METAL TO DESIRED LENGTHS

wheels are sold, because up to this time, the motive power men have found no way to convert them into usable material economically. The scrap iron axles are used in the forging departments of the smith shops, where they are hammered down into forgings for pins, bushings, bolts, etc. Iron axles are in much demand at all shops on the Pennsylvania system, and for that reason, very few have ever been offered for sale. The company makes use of part of the scrap steel axles in this same manner, but there is occasionally a surplus which is sold.

Steel is an item of scrap in which the dividing line that determines whether the material be utilized at home or sold is rather indefinite. According to the Pennsylvania specifications, scrap steel of dimensions not over 22 inches wide and 6 feet long is known as miscellaneous steel, No. 1. Scrap steel of greater dimensions is known as miscellaneous steel, No. 2. As a rule, the metal yards are operating on the rule that everything which can be sheared shall be cut up for No. 1. The larger pieces, such as mud rings, draw bars, locomotive frames, etc., constitute No. 2 steel. In case there is any doubt as to whether a piece is steel or wrought iron, it is sheared. If the cut section does not indicate the nature of the metal, the piece is thrown in with miscellaneous scrap, where the presence of either steel or wrought iron is permissable.

Part of the No. 1 steel is stacked for use in the forging shop, where it is hammered into blooms which eventually are worked into engine truck frames, piston rods, crosshead pins, etc. The furnaces where this work is done yield a sufficient amount of waste material to make it profitable to sell it to various iron and steel manufacturers. There are a number of articles, however, which are not allowed to go into these classifications of steel. For instance, steel couplers and knuckles are sold under separate specifications, as are heavy locomotive driving wheel axles, boiler steel, locomotive tires, and steel from destroyed steel cars. Under this last class is included side and floor plates, angles and shapes from gondola, hopper, flat and box cars of steel construction.

FIG. 7—SCRAPPED CAR WHEELS ARE BROKEN UP AND CHARGED IN THE CUPOLAS OF THE WHEEL FOUNDRY

FIG. 6—A HOME-MADE DEVICE FOR BACKING NUTS OFF BOLTS. RUSTED NUTS ARE REMOVED FROM BOLTS, RETAPPED, AND PLACED IN SERVICE AGAIN. THE BOLTS ARE STRAIGHTENED AND RETHREADED

Steel turnings are sold outright to scrap brokers, and every effort is made to effect the sale and shipment of such material with the least possible amount of handling. Wrought and steel punchings and clippings, light sheet scrap and screw cuttings are handled and sold in the same manner. Materials of this kind are easily loaded and unloaded by means of magnet-equipped cranes, which bring the cost of one handling down to

less than 6 cents per gross ton. Fig. 2 shows a locomotive crane loading steel turnings for shipment.

Steel tanks, including air reservoirs for cars and locomotives, steel drums, etc., are sold when no use for them can be found. As a rule, however, many of the tanks discarded because of failure to pass the critical inspections and tests for locomotive service, are suitable for storage purposes in shops and yards. Steel springs are never sold because the spring shops have facilities for using up old spring steel in the repair and manufacture of springs.

One of the most important items of second hand material is known as miscellaneous car scrap. It is made up of the wrought iron and steel forgings, and gray iron and malleable castings from the bodies of wooden freight cars. The replacement of wooden equipment with steel cars has brought about the retirement of a large number of the old cars each year. In studying the problem of recovering the scrap from these old cars, it was found that the most economical method is to burn the bodies and dispose of the resultant mass of metal without separating the various kinds from each other.

Destroying Wooden Cars

When a wooden car comes in to be destroyed it is carefully inspected. If the sills are in particularly good condition they may be cut out, providing there is a demand for them for building purposes on the railroad. As a rule the master carpenter of each division keeps in touch with the metal yards and is able to draw much of the wood required for some purposes from the destroyed cars. The couplers and air brake equipment are removed and the body of the car is swung from the trucks by one of the cranes, as shown at the left, in Fig. 1. The trucks are dismantled and the various parts disposed of in the usual manner. When six or eight car bodies have accumulated, three or four laborers set fire to them at quitting time, and then remain for a few hours to see that the burning is complete and to guard against danger to surrounding property.

Metal is Not Separated

The following day, when the metal is cool, laborers pick up the tangled mass of metal and pile it near the tracks so that it may be quickly and easily loaded. Often it is necessary to use an acetylene torch to cut some of the pieces apart to facilitate handling, and it is the practice to shear some of the longest rods into convenient lengths for handling. No effort is made to separate the various kinds of metal, but certain castings, easily recovered from the entanglement, which may be in demand for repair parts of standard cars, are reclaimed.

During the year 1915, 584 old wooden cars were destroyed at the Altoona metal yard. Fig. 3 shows several freight cars and an old wooden cabin car being destroyed by fire. Wooden cars are fast becoming obsolete, even in passenger service, and it will be but a few years until all of this type of equipment will have been supplanted by modern steel cars. Wooden passenger cars are very seldom destroyed. They are usually much in demand for use as camp cars for construction gangs, temporary station buildings, switchmen's shanties, and other small buildings along the railroad. The Pennsylvania also sells some passenger cars to smaller roads and to steel companies and other corporations operating small private railways. Old locomotives have always been a source of trouble around the shops of a railroad. They take up valuable space on storage tracks, and are difficult to handle in trains, while being hauled from one place to another. Fig. 8 shows 33 locomotives of more or less obsolete types awaiting disposition. They are either beyond repair or are much too light for even branch line service. The locomotives are usually sold to an equipment company on commission. A joint inspection is made by representatives of the railroad and the equipment company, and a minimum selling price is agreed upon, in which the cost of repairs is included. It is also agreed that the equipment company is to advertise freely and use its best methods to sell these engines at the maximum prices available. If the minimum selling price is not realized in a reasonable time, or if it becomes necessary to use the space they occupy for other purposes, the locomotives are torn apart, the reclaimable material being utilized in the shops and the remainder sold.

FIG. 8—THIRTY-THREE OLD LOCOMOTIVES WAITING FOR DISPOSITION. THEY WILL BE SOLD TO AN EQUIPMENT COMPANY OR, IF A SATISFACTORY PRICE CANNOT BE OBTAINED THEY WILL BE CUT UP AND SCRAPPED

Track Furnishes Some Scrap

In addition to the car and locomotive scrap, there is an accumulation from the maintenance of way department. Rails, and their fittings, frogs, switches, etc., are the most important items of this class of material. When a track is torn up, or new rails laid, the old rails are carefully inspected by the supervisor. He selects those which are serviceable for sidings and yards. The remainder are sent to the metal yard where they are repaired or scrapped. It is often possible to cut a few feet from the end of a rail, thus eliminating a bad spot, and leaving a section of good material. Frogs and switches are often reclaimed by renewing defective switch points. The scrap rails are sold

FIG. 9—SMALL ELECTRIC TRUCK LOADED WITH 3,000 POUNDS OF PHOSPHOR-BRONZE TURNINGS WHICH WILL BE RECOVERED AND RECAST

FIG. 11—CRUCIBLES FROM THE BRASS FOUNDRY TO BE SOLD TO SMELTERS WHO RECOVER THE BRASS

by the purchasing agent in the usual manner.

The outstanding feature of the Pennsylvania's system for handling scrap is found in the effort being made to reclaim material. From the evidence shown in practically every part of the company's shops and yards, it is certain that the officials are much more desirous of utilizing their scrap than of selling it.

The handling of discarded bolts and nuts is a good example of this policy. Fig. 6 shows an improvised machine for backing rusted nuts off of bolts. One man is able to reclaim a large number of bolts and nuts by the use of this simple device. The nuts recovered in this manner are retapped and if necessary the bolts are straightened and the threads are recut. A great quantity of bolts, nuts, small castings, etc., are lost from cars and locomotives due to the jar of trains in passing over the road. Section gangs make periodic trips over the right of way to pick up this scrap. Fig. 4 shows a gang loading material of this kind onto a work train. Another source of bolts and nuts is the repair shop. The accumulation of old nuts at the Altoona metal yard is sufficient to keep one man at work sorting them.

Fig. 13 shows a home-made device for removing the yokes from couplers. The drop hammer falls upon the coupler, causing the rivets holding the yoke to be sheared. The couplers are then refitted with new yokes, or if unfit for service, are disposed of in the usual manner.

Fig. 14 shows a wheel pit where tires are heated. After they have been expanded they are removed from the wheel centers. If the wheel centers are good, new tires are applied, but if the centers are beyond use, they are removed from the axles in a hydraulic press. However, before the centers are finally sent to the scrap piles, they are heated enough to melt the lead which forms the counterbalance. Large passenger locomotive wheels yield about 500 pounds of this metal and the ordinary freight locomotive driving wheel will give up about 300 pounds. As the molten lead runs from the wheel it is

FIG. 10—150,000 POUNDS OF BRONZE JOURNAL BEARINGS READY TO BE RECAST. ORDINARILY 75 PER CENT OF THE METAL USED IN THE MANUFACTURE OF BEARINGS IS SCRAP

FIG. 12 — A BIN OF FOUNDRY SWEEPINGS. THIS MATERIAL WILL BE WASHED AND SCREENED AND THE BRASS RECLAIMED

directed into small molds which shape it into pigs.

Brass and bronze, the most expensive metals extensively used in railroad equipment, are recovered more economically than any other material. Journal bearings constitute an important item of this class of material.

A few years ago these bearings constituted 50 per cent of the output of the foundry, but at the present time they amount to only 30 or 40 per cent of the total. The bearings are made of bronze and are lined with a soft metal. The linings are melted out of the bronze bodies

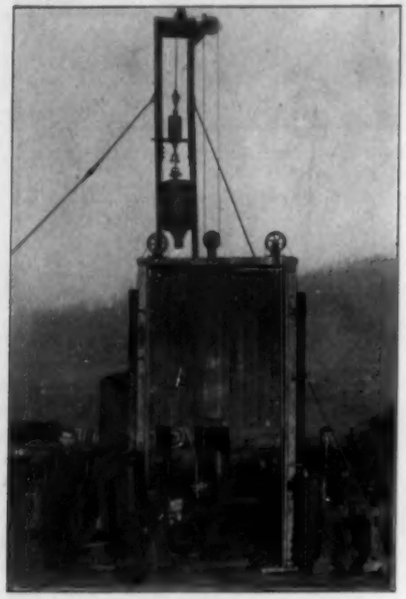

FIG. 13—DROP HAMMER FOR REMOVING YOKES FROM COUPLERS

and cast into ingots which are remelted to re-fill bearings in which the linings have worn below the standard limit of wear. The system for recovering this material is so complete that only 25 per cent of new metal is used in the ordinary manufacture of journal bearings. Fig. 10 shows a bin containing 150,000 pounds of old bronze bearings, waiting to be recast.

Another source of recovered brass is the discarded and broken valves, spindles, cut-out cocks, nipples, brasses, etc., which accumulate in engine houses and machine shops. Material of this kind is shipped to the foundries, where an inspector goes over it to separate the iron and other foreign metals. Many of the more complex articles, apparently brass from the appearance of the exterior, have iron or steel sleeves or spindles inside. The inspector carries a small portable electric magnet, which instantly detects the presence of the undesirable metal, and the article is set aside to be broken up so that the brass may be separated from the iron or steel. The clean brass obtained in this manner is melted and goes back into the manufacture of castings.

Phosphorus and plastic bronze turnings from the various machine shops furnish a considerable amount of scrap. Fig. 9 shows 3,000 pounds of phosphor bronze scrap reclaimed at the Altoona machine shop. In most cases material of this kind is comparatively free from dirt, as the machine shop workmen are instructed to use different receptacles under their machines to catch the chips from each kind of metal. Unless the bronze is badly mixed with non-metallic materials, it is fed to a magnetic separator, which picks out the iron and steel particles. Analysis of the metal as it comes from this machine shows that the bronze is extremely free from foreign substances. It is melted and used again in the making of bronze castings. Over 75,000 pounds of turnings of this kind are recovered from the magnetic separator each month at Altoona.

Metallic Packing

The manufacture of soft metal for piston and valve stem packing is an important part of the work of the Altoona foundry, since the packing for practically every Pennsylvania locomotive east of Pittsburgh is made there. On account of the necessity of maintaining a constant quality of metal, samples of the ingots are carefully analyzed before the metal is poured into the form of packing. This procedure simplifies the use of scrap metal considerably, for it enables the testing laboratory to prepare a formula to bring the resultant metal up to standard.

The packing metal, discarded when shopmen renew the packing, is sent to the storehouse, where it accumulates and is later sent to the foundry. Here it is melted and cast in pigs. About 4,000 pounds are melted at one heat. The pigs of each heat are carefully labeled, and samples are sent to the laboratory. A record of the analysis is kept, and a formula showing the ingredients which must be added to the scrap to bring the resultant metal up to the specifications of standard packing metal is prepared. The pigs are melted again and new materials added according to the formula. If the resultant mixture is satisfactory, as shown by a final analysis, the metal is ready to be cast into packing. The average quality and quantity of the metal reclaimed is such that the formulas provide for about 50 per cent of scrap and a like amount of new metal.

The sweepings from the foundry floor contribute about 7,000 pounds of clean brass each month. The material is wheeled from the floor of the foundry to a ball mill, which crushes the material and washes the mud from the metal. After it has been reduced to a comparatively clean mixture of various metals, it is fed through the magnetic separator. The analyses of the brass as it leaves this machine show that not only the iron and other magnetically affected metals, but also the antimony has been removed. Fig. 12 shows a bin of foundry sweepings which will undergo the cleansing and reclamation process. The crucibles from the foundry are

FIG. 14—WHEEL PIT WHERE TIRES ARE REMOVED FROM WHEEL CENTERS

usually sold to smelters. An attempt is made to reclaim the loose brass from the crucibles at Altoona. The broken pots, shown in Fig. 11, are held until 10 or 15 tons have accumulated and then they are sold. From $5 to $6 per ton is paid for this kind of scrap.

The recovery of non-ferrous metals, however, is not confined to the recovery of cast brass parts. Copper wire is utilized by burning the insulation, cleaning the ash, cutting the wire into convenient bundles, melting it, and casting in small pigs. Car seals are heated to recover the lead. Batteries are saved and the lead, zinc and the mud recovered.

Several items of railroad equipment are disposed of in still other ways. Air brake equipment of many kinds, when taken from obsolete cars and engines, is shipped to the Westinghouse company, where it is utilized. The railroad company is credited with the value of the old parts, and this amount is applied to the purchase of new air brake equipment. The manufacturers of some kinds of brake beams allow credit for old beams.

Sharp Buyers in the Casting Market

A DISCUSSION of the senseless competition that prevails in the foundry industry due to a lack of a knowledge of costs—Business moralities among jobbing foundries are so numerous that bankers hesitate before extending credit—Such conditions result from cut-throat business methods of some foundrymen

WHY are foundries such notoriously bad commercial risks? The business mortalities, especially among jobbing foundries, are so numerous as to rank the line as extra hazardous from the banking standpoint. Most foundrymen explain competition as the chief cause, this in turn being due to the desire of certain foundries to get all the business in sight, and in their efforts in this direction, quote prices that are ruinous to whoever gets the work.

There are many foundrymen who regard other members of their fraternity with a great deal of animosity due to supposed unfair business methods and cut-throat tactics in securing business. The tendency to get together in associations is clearing away some of this misunderstanding and is changing the attitude of suspicion of the honesty of competitors' business methods to the conviction that ignorance of costs is at the bottom of most of the misunderstandings and that unfair competition is simply unintelligent competition.

Lack of Knowledge of Costs

Government investigations into the causes of the alarming and growing business mortalities generally attributes *lack of knowledge of costs* as one of the chief factors. It is beginning to be understood that if everyone knew exactly what each of his products cost to manufacture and sell, that prices generally would be fixed with more intelligence and that many manufacturers would discover the futility of attempting to manufacture certain of the lines that they do in competition with other specialists more advantageously situated.

This is especially true of foundries and more especially so of those of the jobbing type. Much has been written and a great deal of progress has been made in educating foundrymen to know their costs, yet few concerns have really reached a point where their foundry costs are so determined as to be an absolutely safe guide in the conduct of their business. There are probably as many foundries successful on account of good fortune in securing a line that is naturally profitable as from the exercise of special intelligence in quoting prices. The same criticism is made of many manufacturers who operate foundries as one of their producing departments, and who do not take in outside work are making just as serious errors in computing the costs of their finished product as the jobbing foundries. Many a manufacturer who includes foundry operations in his activities has been led far astray in fixing his selling prices by faulty figures on his foundry costs. There are many instances where these errors have been and are serious in causing goods to be put on the market at too low a price and in preventing the sale of other goods whose costs figure higher than is actually the case. Not only does all this apply to concerns that have given little or no consideration or effort to apply cost methods, but is equally true of many concerns with elaborate and expensively operated cost systems.

The foundry offers certain problems in cost accounting that are too little understood and many systems, designed to ascertain foundry costs, fail to grasp certain fundamental principles in foundry operations with the result that their conclusions are liable to be as far from the truth as the rough and ready guess of a competitor who has no such elaborate records.

Many such systems are operated for years without ever discovering their erroneous conclusions and only by some radical change in the character or volume of certain of the products of the plant is the matter brought to the attention of the management. Frequently, such a system is credited with being the last word in up to-date foundry methods, when in reality it is merely an expensive method of collecting records of certain direct and obvious facts and entirely unsuited as a guide to fixing selling prices.

Shrewd Buyers Work the Market

Sharp buyers of castings are able to take advantage of the existing conditions in fixing prices and get the foundry output for much less than it would be possible for them to produce the work themselves.

As illustrating this point one large manufacturer of agricultural machinery regularly places yearly contracts for castings at a flat rate per pound without guaranteeing to have all castings made at a single foundry. Of course bidders quote on what they consider will be an average cost to them and ask perhaps 4 cents a pound. This manufacturer has been making new lines every year for 20 years or more, and sells a great many repair and replacement parts for machines that are no longer manufactured. The result is that the foundry that gets the contract has a continuous procession of single piece orders to fill from old, battered and broken patterns, generally costing more to put into condition to cast from than they get for the work. Then the manufacturer decides to get out a new model of some machine, makes up a fine set of patterns, jobs around and finds another foundry that will quote perhaps 3½ cents per pound on a big run of the new lot.

How it is Done

The new model displaces a large tonnage that the first foundryman expected to produce and he wakes up at the end of the year of unprofitable work, raises his price before he will renew contracts and thus automatically drives Mr. Manufacturer away. Meanwhile contractor No. 2 has been well pleased with his bargain and is perhaps induced to take over the patterns formerly handled by No. 1. Foundryman No. 1 having a feeling of resentment toward No. 2 carefully refrains from warning the latter of what to expect and naturally keeps quiet about the unprofitableness of the work, or even if he informs No. 1, the latter may be inclined to believe his brief success due to superior management and fails to be guided by the experience of No. 2.

In the course of time No. 2 has his eyes opened and the whole procedure is repeated and another foundryman is located who is eager to accept the work; thus this manufacturer has had his patterns with many foundrymen, few of whom have come out with a net profit.

It is not to be inferred that the manufacturer has deliberately sought to get his castings at less than their cost of production by the jobbing foundries, but he long ago discovered he could buy castings for less than he could make them, and believing that concerns devoted to the special

business of making castings were logically able to make them cheaper than he could, he has felt justified in continuing the practice. This is not a fanciful or isolated case, many smaller consumers experiencing equal facility in obtaining castings at less than their cost to produce by jobbing around until they locate some one who quotes a price based on faulty knowledge or entire lack of knowledge of what such castings will cost him to produce.

In non-ferrous metal castings, variations in quotations are more startling than in iron or steel, although the percentage of variation between high and low bids may not be as great. The smaller jobbing foundries are the chief victims of their own ignorance of costs as the losses on a single or few contracts are more vital to their existence than the same loss would be to a larger plant.

In one of our large western cities many jobbing foundries go out of business every year, the vast majority on account of losses sustained by quoting low prices due to ignorance of their costs of production. Quoting too low a price for castings is not the only fault accountable to lack of cost knowledge, as much prospective business is lost through too high quotations due to this same lack of full knowledge of cost facts.

Arbitrary Scale of Prices

A large malleable foundry doing considerable jobbing business in addition to supplying its manufacturing departments, had established an arbitrary scale of selling prices based on a crude classification of patterns ranging from 3 to 6 cents a pound. The sales manager was chagrined to lose a large contract upon which he had quoted the minimum of 3 cents per pound. Believing that he could make these castings cheaper than his competitor, a thorough investigation was ordered into the methods of arriving at quotation prices, with the result that it was discovered that many patterns on which quotations of 5 and 6 cents per pound were being made were costing from 10 to 18 cents per pound; but still more serious, this foundry had been losing a lot of profitable business that could have been had at prices from 2 to 3 cents a pound. The executives of this foundry put themselves in position to quote intelligently on every pattern and rapidly changed the nature of their output as the castings more expensive to make rapidly drifted away to shops less thorough in determining their costs, and castings that could profitably be produced at the lower figures naturally gravitated to the shop that knew this and quoted accordingly.

Many manufacturers have been driven to the establishment of their own foundries when they would have preferred to buy their castings, but on account of the supposedly high prices charged, have decided to save the exorbitant profits paid to the jobbing shops. Usually, these supposedly high prices are due to the lack of knowledge on the part of the producers.

Basing Price on Weight

One of the most frequent indirect causes for faulty pricing is the almost universal habit of considering all foundry costs on the basis of weight of the completed casting. Outside of the cost of the material entering into the casting, there are only a few minor operations in foundry procedure whose costs parallel the weight of the completed parts. Even the cost of material entering into a completed casting of any given pattern is influenced by the total amount of metal used to produce the casting, and the consequent variation in amount of metal lost in making different castings. As a rough and ready means of comparing results, the cost per pound has a certain usefulness, but its chief excuse is its convenience to purchasers and shippers.

Many foundrymen have acquired a mental facility in estimating approximate value of any casting by a mere glance and applying a rude classification and quoting off-hand prices that they believe will cover their cost and profit, and not having any way to currently check all of these guesses (as they can be nothing else), soon believe they have a certain ability in this direction that is positively uncanny. Between plain or fancy guessing to more careful calculation based on a faulty costing plan there is little choice, either method can make for unaccountable losses or drive away prospective, profitable business.

The habit of quoting on a price-per-pound basis has the effect of mentally discouraging quotations outside of certain maximum and minimum figures that prices on a unit basis do not have. Undoubtedly, the habit will persist, its very convenience, even though illogical, will retain many adherents among both the buyers and producers.

Another common cause for faulty quotations is the habit of meeting the other fellow's figures, without regard to whether his figures were established intelligently or not. Many foundrymen assume that if some competitor can quote a certain figure he can quote as low or lower; on the other hand, if a competitor quotes a higher price, he immediately gets nervous and wonders whether he quoted too low.

The foundry that operates as a department of a manufacturing plant frequently establishes costs on a basis of outside quotations, leaving them open to all the fallacies of the typical jobbing foundry. The obvious cure for all of these troubles is a correct knowledge of costs, and by correct knowledge is not meant a collection of minute detail figures pertaining to each and every handling of a pattern and its resultant castings through a foundry, but a thorough knowledge of what factors influence costs, and to what extent they *will* affect any given pattern or casting.

So many of the factors that influence the cost of castings are impractical of direct collection into current cost accounting data that typical cost collecting systems fail to meet the requirements in many foundries having divergent products and conditions of production.

Where there is a reasonable degree of uniformity in classes of castings made and volume of output, or where the varied production is finally assembled into a complete unit, such methods generally serve their purpose very well, and although frequently criticized on the score of expense for operating, usually offer a satisfactory means for establishing selling prices.

Elusive Factors

The elusive factors that make it so difficult to establish proper prices for castings where considerable diversity in sizes of orders as well as in types of castings exist, follow:

First, the question of the number of castings to be made from a pattern or set of patterns offers opportunities for decided variations in cost under different conditions for the same casting. There is always a definite and substantial expense for preparation from the booking of the order and issuing the proper foundry instructions such as locating and examining stored patterns and core boxes; putting these and newer ones into condition for use; locating and supplying flasks, strippers, weights, bottomboards, making matches, cutting core wires and issuing instructions to molders and coremakers.

In foundries where frequent changes of patterns are required a sizeable and expensive organization is devoted continuously or intermittently to the duties necessary to placing patterns

in work. In one foundry, where this subject has been well investigated and which is confined to bench and smaller floor castings, it has been determined that the average cost, merely to start an order is over 80 cents for labor, and that the lowest cost at which an order can be started is 25 cents, while others cost as high as $2, exclusive of chargeable repairs and equipment expense.

Few foundries attempt to segregate these costs against individual patterns or orders, and with many nothing would be gained by so doing; yet with others, it is a factor that encourages more and more short run business, eventually forcing a higher general overhead on all castings, thus automatically driving away business that is not responsible for this increase in overhead.

Handling Unfamiliar Patterns

Another direction in which short orders enhance costs is due to the added time per unit required for molding and coremaking on unfamiliar patterns. Careful tests and observations conducted for the purpose of determining the influence of this factor on foundry costs, worked out in one shop, indicated that it requires 2½ days of continuous work on the simplest machine castings for the average molder to acquire his top speed of production, and in more difficult classes of castings, 3, 3½ or 4 days. It also was established that during the first hour such workmen produce less than 20 per cent of their maximum output, gradually increasing with added familiarity and proficiency. Some foundries attempt to collect this factor of cost, but it is generally ignored, or efforts are made either to conceal it or reduce it by forcing piecework molders to work on standard rates overcoming their loss by giving them other patterns carrying compensating advantages in piece prices.

The two factors of cost due to preparation and acquiring familiarity might be properly termed *order costs*, as they are controlable only to a slight degree by the pattern itself. The proportion of effect of these factors on total cost and consequent proper selling price varies with the number of pieces to be made. For a single or a small number of castings it is overwhelmingly large, while for continuous runs and for heavy castings is almost negligible.

The question of whether to segregate these expenses against individual orders or patterns, or simply to let them become a part of the general foundry expenses needs to be decided on a basis of their effects on each particular line of foundry work that may be under consideration; although technically correct, in many foundries the refinement of accuracy thus obtained would be unimportant, while with others, it may mean the difference between operating profitably or at a loss.

Another elusive factor in foundry costs that makes wide variations in cost per pound in different types of castings, and that rarely receives consideration in typical accounting methods, is the cost of melting the metal required to obtain the finished casting. The practice of treating the operation of melting as a distinct and separate process from molding is not as generally adopted as it should be, although here again the question of its importance needs to be considered in relation to the varieties and types of castings produced in any one foundry.

Few foundrymen realize what their melting costs are, and even when segregated ,seldom include all the factors that enter into the cost of the melting operation, and even when fuel, supplies and labor assigned to melting are separated, the items of depreciation, power, space occupied. supervision and metal losses by oxidation are apt to be overlooked or included in a general expense burden.

With foundries making widely divergent classes of castings, this factor can account for the mysterious disappearance of profits; in fact, in more than one instance it has been responsible for complete business failure, despite elaborate cost accounting records maintained, but which failed to segregate the cost of melting specifically against the different and dissimilar castings.

Considering the Remelt

Although a rather common practice is to consider the average remelt in arriving at casting costs and prices, it is seldom that the specific remelt necessary to individual castings is ascertained or considered in arriving at these figures. A foundry may be averaging 50 per cent remelt and may base all prices accordingly, yet some smaller and difficult castings may require several times their weight of metal to be melted to fill sprues, gates, risers and make up for misruns, while other heavier and simpler castings take not over 20 per cent extra metal to make. In addition to the variation in melting cost per pound of product due to the difference in the amount of molten metal required, the loss by oxidation caused by the melting operation parallels the total melt and is of some importance. The more expensive the mixture the more important it is that this loss by oxidation be placed against each casting where there is a wide divergence in the proportion of remelt, but even with iron castings, failure to properly consider this factor often leads to faulty conclusions that in themselves tend gradually to change the character of the work done by encouraging business with heavy remelts, and driving away the simpler castings.

Although the direct operations of molding and coremaking usually receive close attention in figuring prices, it frequently happens that they are of lesser importance than the more direct costs previously mentioned, but even here many mistakes are made; in efforts to secure business, estimates for these operations are often made without due allowance for size of orders, proportion of losses, and even arbitrarily low and unjust piece rates often are made to force costs down to a point that will insure a profit at the price that some sharp buyer has indicated it to be necessary to meet to get the business. When the castings are being made, concessions in the form of day work, padding the count, or giving a fancy price on other patterns are resorted to to cover the actual costs and to make the figures agree with the estimate.

Cleaning Costs

In the subsequent finishing operations there also are opportunities for divergent costs per pound, such as in sprue cutting, chipping, tumbling, sorting, annealing, grinding, straightening, inspecting and shipping. In the average foundry few of these operations are considered on a cost per unit basis owing to difficulty of collecting reliable costs on current work of these operations. The general practice of placing all or nearly all such operations in a common average cost penalizes many of the simpler castings with a portion of the excessive costs for these operations on the more delicate, intricate and troublesome patterns.

The more complex questions of distribution of selling expenses and the proper apportionment of administration accounts against foundries, and in turn their proper application to orders or specific castings need to be considered with more care than is usually the case. The easiest way of disposing of these expenses by lumping them into one general account and apportioning them on a percentage of labor or total direct cost is not always equitable, and the larger these general expenses are in proportion to total costs, the greater the oppor-

tunity for faulty conclusions by using such methods.

When foundrymen take the same trouble to analyze their processes and the cost factors that enter into their business that they do in analyzing the chemical elements of their materials and products, then the fixing of prices will become a positive arithmetical calculation devoid of the present elements of chance.

The adoption of cost principles that puts foundries on a basis that enables such definite and complete knowledge of their costs need have no greater terrors than the adoption of the principle of buying metals and casting them on definite chemical analysis, instead of by fracture and guesswork.

Likewise, the adoption of such methods usually displaces much otherwise necessary or supposedly necessary clerical labor, just as operating a foundry on definite chemical formulas reduces unnecessary operating labor due to faulty castings.

One of the axioms in manufacturing methods is that the amount of red tape or system necessary in any business will parallel the value of its products. This seemingly holds true in foundry operations, since intelligently fixing prices requires less effort than now is devoted to supplying unsatisfactory and misleading figures.

Hardening and Tempering of Eutectoid Steel

At the annual meeting of the American Society for Testing Materials at Atlantic City, N. J., June 27 to 30, Dr. Henry M. Howe and Arthur G. Levy presented a paper entitled, "Notes on the Hardening and Tempering of Eutectoid Carbon Steel and on the Shore Test." A summary of the paper follows:

If eutectoid steel is heated to 800 degrees Cent., and quenched either immediately or after slow cooling to one or another of a descending series of temperatures, the volume of the quenched steel decreases progressively as the quenching temperature sinks towards the recalescence or Ar1, showing that the arrest of the transformation by the quenching becomes progressively less complete, whereas little change in the resultant hardness occurs. As the quenching temperature is lowered from above to below Ar1 the decrease of volume is greatly and suddenly exaggerated, and a sudden loss of hardness occurs. Further lowering of the quenching temperature does not affect the volume, showing that the transformation completes itself on passing Ar1. The hardness decreases progressively, because of the increased opportunity for the coalescence of the cementite and ferrite respectively.

The microstructural changes caused by tempering are obscure, and seem to be even less usefully indicative than the fracture. The oxide colors found in the tempering cracks are the deeper the longer the tempering at given temperature.

The observed Shore hardness increases with the thickness of the specimen, and with the distance from the edge of the specimen, within limits. The hardness also increases on superposing well-fitting specimens, but not when many specimens are set on one another, probably because of the cumulative effect of surface inaccuracies. It is not known what thickness and distance from the edge are required for true readings, but neither a thickness of 0.62-inch in hardened eutectoid steel nor a distance of 0.078-inch from the edge in tempered steel of about 0.20 per cent of carbon suffices.

On repeating the Shore test in the very same spot, the observed hardness at first increases rapidly, and thus becomes about tripled, so that that of dead soft ferrite equals that of hardened eutectoid steel. After numerous repetitions the observed hardness drops abruptly, often apparently to zero, to recover to or above the previous maximum. This recovery may be spread out over as many as 12 successive impacts.

Increasing frequency of test, though its effect is obscured by these abrupt drops, seems to accelerate the increase of hardness slightly.

The Shore hardness of such a conglomerate as unhardened eutectoid steel may on one hand be extremely uniform, or on the other hand it may vary greatly, with a surprising tendency to be concentrated on two numbers about midway of the range, and to avoid the numbers intermediate between these two.

Manganese and Manganiferous Ores

A recent bulletin of the geological survey department of the department of interior describes conditions obtaining during 1915 which affected the manganese and manganiferous ores industry. The writer of the booklet states that in spite of the great increase in production, the output is still below that demanded in this country. To meet this condition, new domestic fields have been exploited and old mines reopened. The increased activities are due directly to the stimulus of high prices offered for ores and alloys which in turn were due to the elimination of established foreign sources. The domestic production during 1915 was four times that of the previous year. This output of domestic mines comes principally from mines which are located in the following states: Georgia, California, Virginia, Arkansas, Arizona, Colorado, Tennessee, and Texas in the order named. Of the total amount produced, 9,709 tons, 9,159 tons were used in the manufacture of ferromanganese. The production of manganiferous ore was 801,290 tons, most of which came from established sources. Of this quantity, 69,416 tons contained more than 15 per cent manganese and was used in the manufacture of low-grade ferro-manganese; the ores which contained less than 15 per cent manganese were used largely in making high manganese pig iron.

A surprising feature of this industry during the year was the great increase in the imports from Brazil, which were more than twice those of the previous year and more than four times the average of the preceding 14 years. This increase more than made up for the decreased imports from India and the complete cessation of imports from Russia. This decrease in imports of ferro-manganese for 1915 was due in part to the British embargo and in part to a decrease in the available supply abroad.

Book Review

Industrial Leadership, by H. L. Gantt, 128 pages; cloth; published by Yale University Press and furnished by *The Iron Trade Review* for $1.00 net.

As an authority on scientific management, Mr. Gantt has become one of the recognized leaders in modern thought relating to the betterment of industrial conditions. In *Industrial Leadership* he has extended his treatment of the industrial problem beyond the limits of efficiency and scientific management and has attacked it in its most general application to business.

Admitting that the popular wave of efficiency seeking has been of vast benefit to the manufacturer, Mr. Gantt claims that the objects of the movement have been but partly realized due to the fact that the inauguration of efficiency methods has been carried on under the supervision of inexperienced men. Financiers have undertaken to solve the problem of scientific management and have invariably chosen the production department as the one most badly in need of efficiency. Leadership has been largely ignored in the struggle for improved business methods, and good leadership, says Mr. Gantt, is an essential factor in a successful business.

The author touches upon the labor question, intimating a sympathy for the workmen because their problem does not seem to be understood by industrial leaders. He states, "If a man would be a leader, he must know thoroughly the people whom he would lead, and be able to shape his actions in such a manner that they would not only be understood but thoroughly appreciated by his followers." The engineer is the man under present conditions who is best fitted to bridge the gap of misunderstanding between the captain of industry and the workman in the shops. The principles of task work are discussed by the author with special emphasis upon the fact that the ultimate success of such a scheme is dependent upon the leadership involved. The lack of wise leadership has caused the failure of many attempts to install scientific methods and has created contempt in the minds of the workmen.

In a chapter on "Production and Sales," Mr. Gantt brings out the true relation between demand, selling price, supply and profits. He refutes the theory held by many business men that a high selling price is necessary to large profits. In conclusion the author laments the lack of a cost system that will really measure efficiency. Such a system, when devised, will afford an inventory of the value of a system of management, and the figures from it will be a financial measure of the value of leadership.

The book is made up of the texts of five lectures delivered by Mr. Gantt in the Page lecture series, 1915, before students of Sheffield Scientific School.

Extensible Coupling for Mill Drives

ANY user of herringbone gears is familiar with the bad effects of end thrust, or any constraint which does not leave the gears perfectly free to align themselves. The resulting noise, vibration and wear is very objectionable, especially in the case of rolls where a very smooth action is desired. Many efforts have been made to remedy this trouble.

Any fixed end thrust causes too much constraint, and the lack of it allows a lateral motion, due to the drift of the motor armature or any other external forces acting on the shaft, to be transmitted directly to the pinion, with the disagreeable results before mentioned. Flexible couplings have been, and are being, widely used with the idea of relieving the gears from these end thrusts. Some of the existing types are designed primarily to take care of misalignment and possess sufficient axial friction at working loads to transmit end pressures of objectionable magnitude. They therefore do not afford a true solution of the problem. It was finally found to be necessary to design some form of connection between the motor and herringbone pinion which would (*a*) transmit the necessary power, (*b*) leave the pinion free to align itself with the wear, and (*c*) leave the pinion unaffected by any end thrust, caused by lateral motion of the shaft. In other words, what was wanted was a perfectly extensible coupling. The Cutler-Hammer Clutch Co., Milwaukee, has made an effort to design such a coupling, the general features of which are shown in the accompanying illustration. This coupling is equipped with a magnetic safety clutch

FIG. 1 — CUTLER-HAMMER MAGNETIC CLUTCH AND EXTENSIBLE COUPLING FOR USE ON MILL DRIVES

which has been in use for some years. The clutch and coupling together is said to form a satisfactory drive for rolls. The mechanical construction of the coupling is believed to be very simple, and is shown in Fig. 1. The principal problem in design was to make the discs strong enough to transmit the torque, and at the same time secure the utmost flexibility independent of the amount of torque transmitted. It may easily be seen that the amount of torque transmitted is only dependent on the thickness of the discs, and the size of the bolts. The extensibility is only dependent on the flexibility of the discs, and is independent of the amount of torque transmitted, in that it is the same when no load is being transmitted as when the load is maximum.

In order to secure the utmost extensibility, the discs are laminated, each disc consisting of several thin discs bolted together. The deflection of a thin circular plate under a given load varies inversely as the cube of the thickness. Three ⅛-inch discs will transmit the same torque as one ⅜-inch disc, but the three thin discs will deflect nine times as easily as the one thick disc. Practice has demonstrated the correctness of this theory, and in the case of a 32-inch coupling recently built the force necessary to cause a deflection was much less than the end sliding friction in the bearings. In obtaining extensibility, flexibility is said to have also been secured to a great degree. Flexibility like extensibility also is unaffected by the amount of torque transmitted by the coupling of the mill drive.

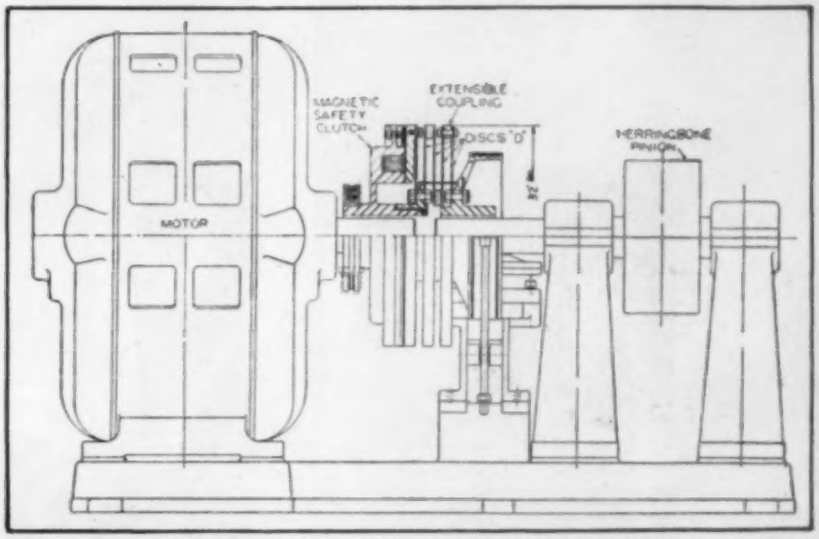

FIG. 2—CUTLER-HAMMER EXTENSIBLE COUPLING INSTALLED ON TYPICAL MILL DRIVE

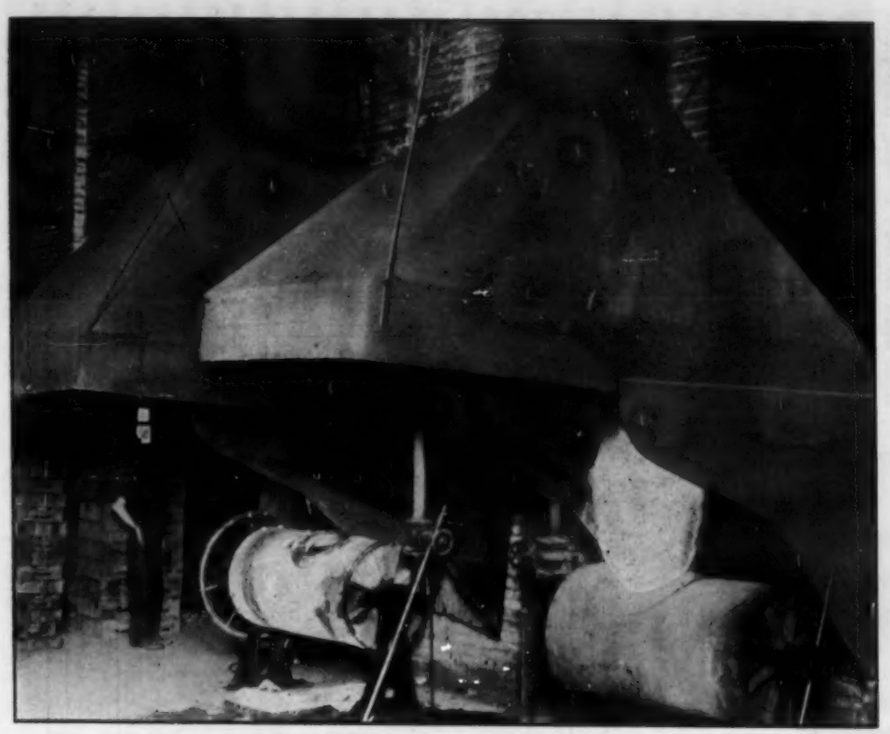

FIG. 1—FURNACES WITH INDIVIDUAL, RIGID HOODS

FIG. 2—CORE OVEN WITH HOODS WHICH CARRY OFF THE GASES WHILE THE CORES ARE BEING BAKED

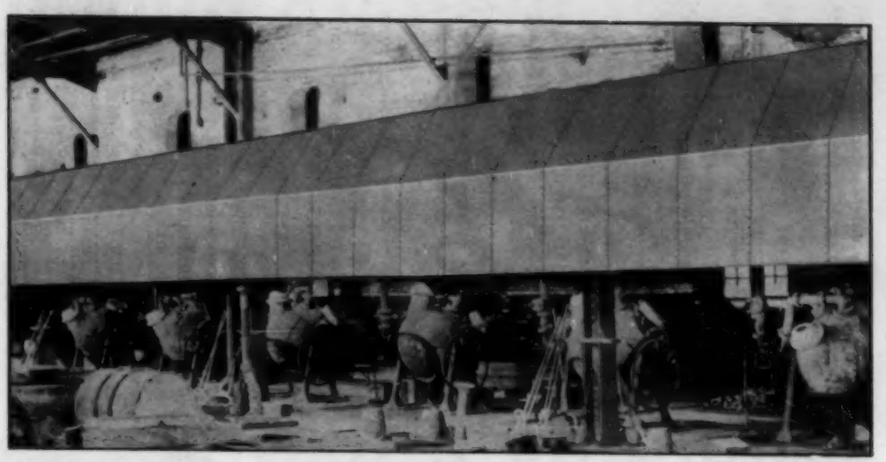

FIG. 3—BATTERY OF FURNACES SERVED BY ONE HOOD, BUT EACH FURNACE VENTILATED BY INDIVIDUAL STACK

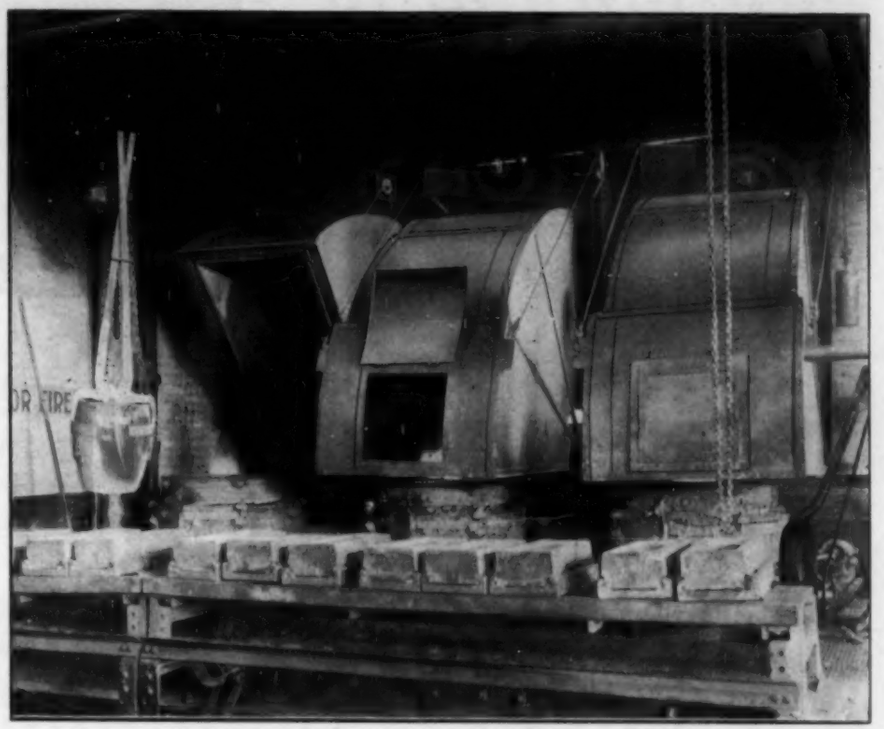

FIG. 4—STATIONARY FURNACES WITH INDIVIDUAL, TELESCOPIC HOODS

How the Sanitation of Brass Foundries is Promoted by Good Ventilation

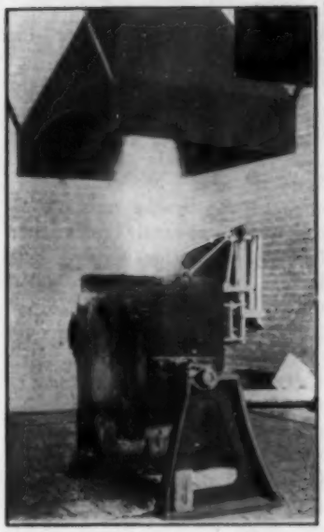

FIG. 5 — TILTING FURNACE PROVIDED WITH AN INDIVIDUAL HOOD

FIG. 6 — FOUNDRY STOVE WITH COUNTERWEIGHTED, SLIDING HOOD

THE subject of brass foundry ventilation is discussed in a copyrighted bulletin recently issued by the Committee on Safety and Sanitation of the National Founders' Association, which constitutes also one of the interesting chapters of the volume, entitled "Safety in the Foundry", by Magnus W. Alexander, chairman of this committe, and issued under the auspices of this society. The subject of ventilation is discussed as follws:

"Foundry buildings usually are large and high, with a great amount of window space available for ventilation, and each foundry employe is provided with more floor area than is ordinarily alloted to workmen in many other occupations. The advantage of much working and breathing space, however, is offset in more or less degree by factors that tend to vitiate the air. The fumes thrown off from molten metals which contain zinc may injuriously affect the health of workmen. Much objectionable smoke sometimes arises from core ovens or from molds containing cores in those foundries where the amount and size of the cores is comparatively large. Fumes arise also from acids employed in the cleaning and pickling of castings. All foundries are also confronted more or less with the dust problem, which is particularly aggravated in cleaning departments and in sand-blasting rooms.

"For all of these conditions practical remedies have been found and put into service. This has been accomplished sometimes by effective natural ventilation, sometimes by a system of forced draft either for general ventilation or for the ventilation of individual rooms or particular furnaces or machines. Improvements in the combustion of fuel or the use of practically smokeless core binders has often eliminated the necessity for more than ordinary ventilation. Cleaning room floors of brick, concrete or wood blocks can be more easily kept free of excessive dust than floors made of clay; an occasional sprinkling of the floors helps materially to keep down the dust. In certain classes of work where it is impossible otherwise to secure satisfactory relief from fumes and dust, workmen are provided with respirators or other health protective devices. Natural ventilation is most frequently employed because it is most economical and in many cases fills all requirements. Open windows in the lower part of the building allow the entrance of enough fresh air to drive the impure air up and out through open windows usually located in the monitor. Where, however, the roof is comparatively flat, there is a tendency of smoke or steam to remain in low hanging clouds, even when the windows are open.

"In some cases the smoke developed in the foundry is so great that the amount of natural ventilation required for its removal creates drafts that are objectionable to workmen, especially on cold days. To overcome this difficulty, the heating apparatus is located alongside of small openings in the wall where the heated air intercepts and tempers the cool air as it comes into the building, or the lower windows are slanted so as to deflect incoming air upward, thus avoiding a direct draft on the workmen. Sometimes it is sufficient to open the windows during the pouring and smoky period only.

"In foundries in which metal is being poured several times during the day or where the pouring operation is practically continuous, smoke or steam is constantly generated, and measures are required to provide constant relief. The situation is usually met by the installation of a system of forced draft with openings so located as to discharge fresh air into the room, cool in summer and warm in winter, at about or a little below the breathing zone; of course, suitable outlets, usually located in the monitors, also must be provided.

"Where foundry operation develops unusual quantities of fumes, ventilating hoods are installed at specific points to supplement the general ventilation. These hoods are found particularly in connection with brass furnaces, core ovens and various kinds of heaters and

FIG. 7—TWO HOODS SERVE THREE FURNACES EACH

dipping tanks. In some instances each hood serves a single furnace, oven, heater or tank, while in others large hoods extend over groups of such apparatus. The individual type has usually proved to be most efficient. Figs. 5 and 1 illustrate individual hoods of simple design, suitable for use with brass furnaces of the tilting type. Fig. 4 illustrates three individual hoods, each of which is made in three sections. The wall section is rigid and is connected at its rear to an individual stack; when necessary, to make room for the use of a hoist for placing or removing crucibles, the other two sections, which telescope over each other and the rigid section, are raised out of the way. When lowered, the bottom sections of the hoods are close to the furnace tops and prevent the escape of fumes into the room. Fig. 7 illustrates two hoods of the group type, each of which serves three tilting furnaces; in this case the metals melted are low in zinc content, and the two hoods have proved adequate to keep the air free of objectionable fumes. Fig. 3 illustrates a hood serving a number of furnaces; each furnace, however, is provided with an individual stack. Fig. 2 shows hoods for ventilating core ovens.

FIG. 8—LADLE HEATER WITH HOOD

"In many cases, it has been found that the excessive smoke from core ovens was due to imperfect combustion of fuel oil, which in turn was caused by unsuitable burners or their improper adjustment. In coke or coal-fired ovens the difficulty has often been traced to flues that were faulty or limited in size or clogged with soot. The improvement in foundry ventilation resulting from attention to these simple details has been surprisingly effective. Fig. 9 shows two of the many hundreds of hoodless core ovens that have been rendered practically smokeless by securing proper combustion and draft. An important factor in the prevention of smoke from cores either while they are in the ovens or in the molds, is the character of the core binder in use. It is well known that flour, resin and some core oils abound in smoke producing elements. Many foundrymen have cleared their foundries and core rooms of this aggravating smoke nuisance by substituting for these materials readily available core binders that will not develop smoke to any great extent. The use of mechanical devices for mixing core sand with the binders also lessens the amount of smoke thrown off from cores, as the more thorough mixing requires a smaller amount of the binder; the less binder used, the less resulting smoke.

"Where, on account of the large size of the cores and the character of the castings, the objectionable smoke cannot be avoided, it has been found to be good practice to place such molds at one end of the foundry or even in a separate room and to pour the smoky molds last so as to isolate the smoky molds and confine the smoky condition to a short period at the very end of the day. Another cause of smoke in foundries lies in the practice of drying ladles by making wood fires in them. Modern practice obviates this smoke nuisance by the use of specially constructed ladle heaters for drying small ladles; one of these heaters is illustrated in Fig. 8. Large ladles, on the other hand, are dried in core ovens or in other well-ventilated places where the smoke will not foul the foundry air. Moreover, the amount of smoke in foundries is reduced by careful preparation of cupola fires and by thoroughly burning the wood kindling before applying the blast. Sometimes excessive fumes are caused by burning high sulphur coke or coal in salamander stoves, which are frequently used in foundry buildings for temporary heating purposes; even when low sulphur fuel is used, the gases may prove objectionable, especially to cranemen or others working in high positions. A proper hood placed over the salamander stove, as shown in Fig. 6, will take care of the situation. The chief advantage of this arrangement lies in the counterweighted, adjustable hood which slides up on the stack to permit feeding of fuel into the stove, but is afterward lowered to trap the gas and carry it out through the roof. Usually, a number of stove pipe openings are made in suitable places in the roof, each provided with a cover for use when the stoves are out of commission; in this way the salamander stoves can be moved to various places in the foundry and readily be connected with ventilating stacks. Especially good ventilation is required in dipping and pickling rooms to guard the health of workmen; this should not be neglected even though workmen wear suitable respirators. When the construction of these rooms is such that ventilation from open windows does not suffice, artificial ventilation is secured through the use of fans, either placed in wall or window openings or connected with ventilating hoods. The dust in the

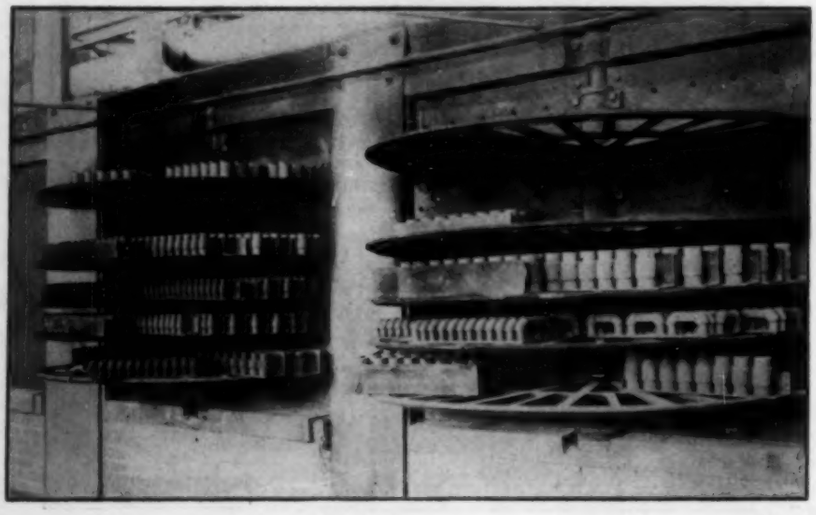

FIG. 9—CORE OVENS WITHOUT HOODS, YET PRACTICALLY SMOKELESS

foundry is an important factor in foundry ventilation. The dust is usually not objectionable in molding or core rooms, except in isolated instances where castings are poured only once or twice a week, and fine sand becomes dry meanwhile and floats as dust in the air. Occasional sprinkling of the floors provides a good and effective remedy. In cleaning rooms, on the other hand, dust presents a real problem that requires more serious attention. An excessive amount of dust is created here by the hand-cleaning of castings, the knocking out of cores and by mechanical cleaning operations, as in the tumbling machine process. The dust problem looms up most seriously in sand-blast rooms and here extraordinary means of ventilation are used; in addition, the health and safety of the operators are conserved by the use of special protective clothing and by the installation of equipment to safeguard health.

Industrial Developments in Trade Schools

THE University of Illinois has issued a reprint of a paper entitled "Shop Instruction at the University of Illinois", contributed to the proceedings of the Society for the Promotion of Engineering Education by B. W. Benedict. This paper describes in detail the organization of the University of Illinois shop laboratories. The author goes over considerable of the ground covered by R. E. Kennedy and J. H. Hogue in their paper on the same subject published in *The Iron Trade Review*, Sept. 30, 1915.

In the introduction to his paper Mr. Benedict outlines very closely the changes in industrial conditions in recent years which have brought about corresponding changes in shop instruction in technical schools. Mr. Benedict's remarks covering this phase of the problem are as follows:

"Mindful of the undoubted influence of the shop laboratory upon the development of technical education during the past 45 years and acknowledging without reservation the value of shop training, in my opinion conventional shop work or manual training no longer has a place in the curriculum of the technical school which seeks to prepare men for conditions confronting its graduates at the present day. The old formulas which served so well in the pioneer days of industry no longer fit in the new order of things and failure on the part of educators to grasp the significance of the upheaval going on in the industrial world would be disastrous to the shop and correlative subjects. Industry in the past was effective but not efficient. A pioneer product grown to immense bulk on lines of least resistance it knew very little about its complex structure and was too busy to find out. Large markets not especially particular about price demanded organization for tonnage production rather than for economical production. Highly specialized service was not required in a large degree nor was it widely sought.

"An inevitable readjustment to changing trade sociological conditions was destined, however, to sweep aside the old structure and supplant it with a new. While the usual processes of evolution had brought about certain changes a new note in industry was sounded in the late eighties, the real effect of which was not apparent for nearly a score of years. Then like a wave "Scientific Management" swept over the country as the topic of the moment. Not only industry but society as well developed an intense interest in this new specific for industrial conditions. Brushing aside all the clap-trap about scientific management which has arisen through misunderstanding of its real significance there stands the unmistakable fact that fundamental changes are taking place in the industrial structure. Principles which ruled heretofore are giving way to those founded upon broader conceptions and higher ideals. Accumulation of knowledge concerning fundamentals is both rapid and wide in scope. The old hazy images around which industry has worshiped are going down before definite standards of attainment, of organization, of methods. Experience moulded on traditional lines is no longer in such demand as that of the trained specialist, leaving the colleges no alternative but reorganization of courses of training if men are to be adequately prepared for the service which industry now demands of them. Such a reorganization presents its difficulties but it must come and quickly if it is to be effective.

"The relation between education and industry is indissoluble. The ideals of education are to develop men into better men, morally, mentally and physically; and if an educational system failed in this mission it would pass into decay as a useless feature of society. That it does not decay but continues to exert an ever widening influence in the development of civilization is a sign that education has not failed in the practical achievement of its ideals. The conclusion is also obvious that education has continued to meet the ever changing demands of society. Side by side with the evolution in industry which during the past century has been marked by striking changes from old forms to new, we see equally significant developments in educational methods. From the first, technical education and those special interests of society it aims to serve have enjoyed a particularly close relationship. The first has sought not only to solve technical problems by direct assistance in the research laboratory but also by offering training to young men for the special services required. Industry in return has taken an active interest in education and exerted a powerful influence on its development. The principal demand of industry on education is that it must be "practical" and courses in shop work seemed in large degree to fulfil this requirement. For forty odd years the college shop has flourished in an auspicious environment due to the enthusiastic support manifested by those interests which contributed so generously to the advancement of technical education. It has performed a great and useful service and won its right to a place in the higher institution of technical education but it stands to lose that place if early traditions continue as the source of inspiration for its activities. Originally the one bright "practical" spot in a group of "theoretical" courses, it is now one of the least practical if it offers no more than the traditional form of manual training. Performance of simple shop processes such as have been the rule in these courses without definite relation to elements of time and cost have little value in the training of men who must face modern industrial conditions. Manipulative processes very properly have a place in secondary school training and some acquaintance with them in that environment is desirable but the college shop must aim beyond this and administer courses relating to the principles underlying the use of these processes in industry. An understanding of the principles of industrial economics, of shop organization, of production, and of executive control, is what industry demands of college graduates today."

WHAT'S WHAT and WHY

Don't Ask Yourself-Ask Us!

Questions from our Readers answered by Experts

Cost of Small Stack in Spokane

We are anxious to obtain information regarding the smallest size of blast furnace it is practical to operate for the smelting of iron ores. We have many deposits of iron ores near Spokane and desire to operate a small stack to fill our local market of 6,000 to 10,000 tons a year. One of these deposits in particular consists of brown hematite (limolite) which runs about 82 per cent ferric oxide, with no sulphur or titanium, and less than 0.56 per cent phosphorus. Coke costs $7 per ton, and iron ore, $2.50 per ton, delivered in Spokane. The freight on pig iron to Spokane at the present time, is $8 per ton from Duluth. Under these conditions is it practical to build a furnace of say, about 40-tons daily capacity? About what will such a furnace cost installed?

It is entirely feasible to build and operate a furnace of 40-tons daily capacity, although the cost per ton of pig iron produced in such a small furnace would necessarily be high in comparison with that produced in larger furnaces which could be handled by the same number of operators. The cost per ton of pig iron may be estimated on the basis of one ton of coke per ton of iron produced. Judging from the analysis of the ore from the local deposits, the cost for the ore per ton of pig iron would be approximately $4 to $4.50; the 800 to 1,200 pounds of limestone needed per ton of finished iron, it is assumed, could be delivered to the furnace for $0.50, and allowing from $3 to $4 per ton for conversion and selling, the total cost per ton of pig iron is estimated at $14 to $15. With pig iron selling for $18 at Duluth at the present time and considering the freight rate, the margin is about $11 per ton of metal. This margin might be considerably reduced after the war if freight rates drop materially. The cost of such a furnace is purely a matter of conjecture because of our unfamiliarity with local conditions which affect the cost of construction. The type of foundation, the grading required for tracks and similar considerations are important elements in figuring the construction cost of a furnace. We believe, however, that a small furnace could be built for $150,000 to $250,000. The total investment might amount to $400,000.

If a ready market were secured for all the pig iron produced, if the furnace were operated continuously and if the ocean freight rates would prevent foreign competition in the future as they do now, there seems little doubt but that the plan would prove successful.

How is Ferro Sold?

Will you please inform us whether ferro-alloys are sold on a gross ton or a net ton basis? We have particular reference to ferro-manganese.

Ferro-alloys, in common with most other raw materials used in the iron and steel industry, are sold on a gross ton basis. This includes ferro-manganese, which is sold on a 2,240-pound basis.

Analysis of Taylor-White Special Steel

Will you kindly state in your columns the analysis of the original Taylor-White special steel?

Taylor and White perfected a process of treatment which is said to improve all kinds of special tool steel. This process involves heat-treating which is carried out in two distinct steps. The analysis of this steel is as follows: Tungsten, 8.00 per cent; chromium, 3.80 per cent; carbon, 1.85 per cent; manganese, 0.30 per cent; silicon, 0.15 per cent; phosphorus, 0.025 per cent; sulphur, 0.030 per cent.

Wastage in Working Crank Shafts

What is the wastage resulting from the forging and finishing of large steel crankshafts? Please describe the methods employed in forging. Why is the cost of such forgings so high?

The work of the forge shop begins with the bloom, which is cylindrical in shape with either a smooth or corrugated surface. The bloom should be of sufficient size to allow approximately 1½ pounds for each pound of the rough forging. The bloom is drawn down to insure homogenity and maximum strength, and in most cases this operation reduces the diameter of the metal about one-half. The hammer stresses formed during the drawing process are relieved by heating the forging slowly and evenly at a temperature of from 1100 to 1200 degrees Fahr. After the metal has been annealed in this manner for several hours, it is allowed to cool slowly in the furnace. When sufficiently cool to work, it is machined to approximate dimensions and then heated in a gas furnace to about 1200 degrees Fahr. The forging is then quenched in oil, reheated to the proper temperature, and if necessary subjected to further heat treatment. The crankshaft is brought down to finished dimensions by turning or grinding.

Small pieces are cut from the forging as the work progresses, and the physical examination of these test pieces indicates the nature of the heat treatment required. If the cranks are slightly out of alignment the stem must be given a forging heat and twisted to the required shape.

The wastage amounts to approximately 75 per cent. This wasted quantity of high grade material, coupled with the expense of equipment and labor, and the manufacturing risks involved, accounts for the high cost of the finished product.

David Tod, Ohio's Second War Governor

THE first commission which William McKinley held in the Union army was given him by David Tod, the second war governor of Ohio, and for this reason it is considered highly fitting that a bust of Mr. Tod be placed in the McKinley Memorial at Niles, O., the birthplace of the martyr President. The bust of Mr. Tod will be of bronze, 3 feet 6 inches high, with a granite pedestal and will be the only bust in the G. A. R. room.

David Tod, the son of George Tod, one of the pioneers of the Western Reserve, was born at Youngstown, O., Feb. 21, 1803. Like his father, who had been one of the great lawyers of Ohio, having served 14 years on the Supreme bench, Mr. Tod studied law and was admitted to the bar in 1827. Much of his success during his 15 years as a lawyer was attributed to his almost faultness judgment of men with whom he came in contact.

After the death of his father in 1841, Mr. Tod came into possession of the old homestead near Youngstown, known as Brier Hill farm. This farm became the source of great wealth and was the starting point of the industry which made the valley one of the wealthiest in Ohio. For several years coal had been mined on this land, but because of the limited local consumption, the deposits were not deemed of any great value. It remained for Mr. Tod to find a market for these deposits, the value of which he was quick to perceive. The open-burning character of Brier Hill coal had previously been noted and for this reason it was especially suited for steamboat navigation. Two years prior to this time, transportation between Youngstown and Cleveland through the canal had been opened and Mr. Tod shipped two canal boat loads of coal to Cleveland, urging engineers to accept it for experimental purposes. Very few of the engineers were willing to test the efficiency of the coal, but those who did were soon convinced of its great utility. These two boat loads of coal shipped by Mr. Tod to Cleveland marked the beginning of the use of coal on steamboats. From this time on, Brier Hill coal became very popular and one mine after another was opened, the market expanding faster than the mines could be developed. The introduction of raw coal in blast furnace practice, which followed shortly after the opening of the Brier Hill property, made the almost exhaustless deposits still more valuable.

One of Mr. Tod's most striking characteristics was his perfect confidence in all his undertakings. Shortly after the Cleveland & Mahoning railroad enterprise was inaugurated by Warren, O., capitalists, Tod became interested and was subsequently chosen director and president. It was through his influence that a loan was executed with which the first locomotives used on that railroad were purchased. He was also one of the organizers of the Brier Hill Iron Co., Youngstown, which built its first stack in 1846, this being among the first stacks operated in the Mahoning valley. This furnace was the forerunner of the Brier Hill Steel Co., a factor of increasing importance in the steel world.

DAVID TOD

In early life, Mr. Tod declared himself a staunch Democrat, and was sent to the state senate by that party in 1838. Under President Polk, in 1847, he was appointed minister to Brazil, a post which he held for five years. Mr. Tod was a very eloquent and convincing political speaker, and at the Baltimore convention held in 1860, to nominate a president, he was selected to serve as first vice president. When the southern members bolted and the chairman left his post, Tod showed his great power by quickly calling the convention to order. While he made every effort to restore peace in the south and strongly opposed the civil war if it could by any honorable means be averted, he was one of the most active in organizing troops after the declaration of war. The first company of troops organized at Youngstown, the Nineteenth Ohio Volunteer Infantry, was equipped largely at his expense, and before leaving camp, each soldier received as a present from him an overcoat, which were afterward known in service as "Tod coats".

In 1861 he was elected governor of Ohio on the Republican ticket, but because of the firm stand taken by him on several issues during the civil war, he made a number of enemies and therefore was not a candidate for re-election. He remained active politically, however, to the time of his death, and did much for the good of his party and country. He was a very close friend of President Lincoln, and made frequent trips to Washington during the war and even after he retired from the governorship. He arranged the famous meeting of war governors held at Altoona in the early days of the war. He died Nov. 14, 1868. He was indeed a national character, one of the strongest of Ohio's many distinguished sons.

Will Sell Gold Dollars

The National McKinley Birthplace Memorial association of which J. G. Butler Jr., of Youngstown, O., is president, has determined upon the price to be charged for each of the 100,000 McKinley souvenir gold dollars, the minting of which coins congress has authorized. For any number of the dollars up to 10 the price will be $3 each; for 10 or more, $2.50 each will be charged. Postage and registration charges will be borne by the association. A large number of orders for coins have been received by the association, some asking for as many as 25. A consignment of 10,000 coins has arrived at Niles, O., where the memorial is being erected, and is deposited with the Niles Trust Co. As rapidly as required, additional coins will be forwarded by the federal treasury department. The proceeds of the sale will be devoted to completing the building of the memorial.

Stanley O. Aikens, assistant traffic manager for the American Steel & Wire Co., Worcester, Mass., died at his home in that city, Aug. 16, from infantile paralysis, aged 22 years. This is the first fatal case of the disease in Worcester among the 13 reported to the board of health.

News of Employers and Employes

Results of Investigating Labor Conditions in Canada—Several New Strikes Declared in New England

TORONTO, Aug. 22.—The provincial organization of resources committee has been investigating labor conditions in munition factories in Toronto, Hamilton and other Ontario cities. It has received from the imperial munitions board at Ottawa a communication stating that "the deliveries of munitions from Ontario are running far behind the quantities promised, and we are seriously apprehensive that the existing conditions cannot be bettered". The committee issues a statement to the effect that this shortage in production has been largely due to the inadequate supply of skilled labor. This has hampered factories turning out steel forgings and component parts, which in turn has adversely affected operations at machining and assembling plants. But these latter, even when fully supplied with forgings and component parts, have been unable to make deliveries as scheduled owing largely to the shortage of labor. The committee urges those engaged in non-productive work or the production of luxuries to consider employment on munitions as the next best service to going overseas, and calls upon the Women's Emergency Corps to register women for munition work or work that will release men for the munitions industry. The committee finds that efforts to use female labor are meeting with success. In many places women have registered and are waiting to be called to work. In Welland last week 95 women responded to the call of a factory which needs 150 to 200, and 50 per cent of the applicants had never been in regular employment before. From $4 to $7 and even $10 per day is not uncommon wages for men engaged in munition factories on a piece-work basis.

The Algoma Steel Corporation, of Sault Ste. Marie, Ont., has made a further increase of wages, common laborers being paid at the rate of 22½c per hour, which represents an increase of 50 per cent within practically the last 12 months.

Protest to President

The Worcester, Mass., branch of the National Metal Trades Association, through Jerome R. George, its president, has wired President Wilson protesting against his plan to the railroad heads that they grant an 8-hour day to the employes, on the ground that it would be establishing a precedent which will eventually put all industries, public and private, into the hands of irresponsible labor organizations and discredit arbitration as a means of settling disputes. Messages have also been sent Col. George Pope, president of the National Association of Manufacturers, and W. H. Van Dervoort, East Moline, Ill., president of the National Metal Trades association, enclosing a copy of the protest wired to the president, so that other organizations may take similar action. Following the publication of President George's message the central labor union of Worcester, claiming to have a membership of 12,000, wired President Wilson imploring him to continue efforts with the managers to grant an 8-hour day and resenting the suggestion of Worcester branch for arbitration as inconsistent with its policy.

May Go On Strike

New Haven, Conn., Aug. 22.—Machinists employed at the Westchester Repeating Arms Co.'s plant have voted to go out on strike unless the company grants an 8-hour day and other concessions. The company employs about 18,000 hands, about 2,500 of which are machinists.

Large Increase in Employes

Detroit, Aug. 22.—A total increase of 25,501 employes in 14 Detroit automobile factories, or 49.04 per cent, over 1915, is the record for 1916 as compiled by the state labor department. In 1916, the Detroit automobile factories given in the report showed 75,126 males and 2,369 females employed, a total of 77,495. The 1915 figures showed 50,174 males and 1,820 females, a total of 51,994.

That Detroit's prosperity is not confined alone to the automobile industry is shown by another set of figures which shows other manufacturing plants where an increase of 5,904, or 35.29 per cent. These are: Detroit City Gas Co., Detroit Copper & Brass Co., Detroit Edison Co., Detroit Shipbuilding Co., Detroit Stove Works, Detroit Screw Works, Great Lakes Engineering Works, Kelsey Wheel Co., Michigan Copper & Brass Co., Morgan & Wright, Peninsular Stove Co., and one or two others. This year these concerns employ 22,631 males and 4,472 females.

Other cities of Michigan show gains, also. There is a gain of 21 per cent in Grand Rapids, 21.61 per cent in Lansing and 39 per cent for Muskegon.

Troubles in New England

Labor troubles have broken out fresh again in New England, with the machinists union in the lead, although it is not a part of the general campaign that has been predicted for many months. It was a result of a visit by President W. H. Johnson and other international officers to Connecticut. The principal trouble was at the plant of the Winchester Repeating Arms Co., New Haven, where 18,000 men are employed. Although the 2,000 union machinists voted to strike, only about 300 of them failed to return to their work. The demands made of the company were an 8-hour day, with overtime at time and a half; wages to be increased so that there is no change in that respect with lessened hours; the company to adjust grievances through a shop committee; no discrimination against the shop committee members and discharge of an employe to be explained in plain English. The attempt made to make the strike general was also a failure. Coincident with the strike, 51 other New Haven manufacturers announced that under the present conditions they will not make any general change in their schedules of working hours, nor grant any demands that are being promoted by labor agitators. The only other trouble in New Haven is at the plant of the Geometric Tool Co., in the Westville suburb, where 200 toolmakers struck Friday because a shop committee sent to the management with an 8-hour day proposal had been discharged.

Two new strikes have taken place in Massachusetts, the largest being at the plant of the Westfield Mfg. Co., formerly the Pope Mfg. Co., which is engaged in making war munitions for the Russian government, where 800 men, mostly machinists, are out. The strikers claim the immediate grievance is the alleged discrimination against union men. They want an 8-hour day, time and a half for overtime and other stipulations, to take effect Sept. 1.

The other strike is at the F. E. Wells Co., division plant of the Greenfield Tap & Die Corp., where 30 men in the tap and die department walked out in

sympathy with five others who were discharged. Union organizers have been working among the machinists in Greenfield for six months and this is apparently the first result of their efforts.

Strike Settled

Wilmington, Del., Aug. 22. — A strike of the boilermakers, welders and other workers at the plant of the Harlan & Hollingsworth Corporation, declared eight weeks ago, has been settled and the men now are back at work. The strikers demanded an 8-hour day with 9-hour pay, in addition to a number of minor concessions. The agreement is that 48 hours shall constitute a week's work for pieceworkers and 54 hours for the day workers, with increased pay all around.

Strike Fizzles

The strike of machinists and toolmakers which began at Hamilton, Ont., on June 12 and in which about 1,400 men were concerned is now practically over. At an early stage of the difficulty, all news relating to the strike was suppressed by the censor, as the effect of the trouble was to paralyze for some time the manufacture of munitions. Early in the season, the royal commission was appointed by the government with a view of settling the question of wages and hours. It reported in favor of a minimum wage of 38½ cents per hour for machinists and 42 cents for tool makers and a 9-hour day. The manufacturers refused to accept these terms, and the men went out. Since then several hundred of the men have left Hamilton and found employment elsewhere. Some of the firms affected have granted the men's demand and accepted the ruling of the commission, and in other cases men have returned to work on the employers' terms. There are now only about 100 of the men left in Hamilton who are unemployed. The Canadian Westinghouse, Burlington Steel and National Steel Car companies have refused to recognize the unions.

Extensive Co-operation

The Bridgeport Housing Co., recently incorporated under the laws of Connecticut with a capital of $1,000,000, will found large and extensive co-operative communities on the outskirts of that city based on novel plans, as a part of its activities. The munition city with its just announced official population of 147,000 is likely to be the scene of the biggest attempt at copartnership ownership yet tried in the United States, if plans submitted by City Planner John Nolen, Cambridge, Mass., are carried into effect. This copartnership plan, which requires enormous capital to make it a success, originated in England and so far has not been fully developed in this country, except in Billerica, Mass., near Lowell. It is being worked out by the Norton companies in Worcester, Mass., and within a few years their Indian Hill community settlement in that city will be a model that is likely to be copied by other industrial establishments in the United States. It is yet in an uncompleted state, although inhabited by employes of the companies, many of whom have already bought their houses. The plan that is likely to be adopted in Bridgeport comprises a joint stock ownership in community where stock subscriptions entitle a resident to a home for which he pays rent, drawing interest on his investment. The plan is such as to permit him to move from a city without entailing sacrifice of his property interests. One-half of the capital stock of the new corporation is said to have been subscribed in blocks, mostly by large manufacturers who desire housing the present and future employe. The efforts of the new company will not be confined to supplying houses for employes of factories, but housing in general will be promoted. Large tracts of land are said to be under consideration by the company, but no definite negotiations have been concluded for the reason that organization has not been perfected. At least one large tract is outside of the city limits. Others are within the city and will be developed according to location. No specific types of architecture will be followed, according to present plans.

Labor Notes

The Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., has decided to continue the bonus system for another six months, from July 1, 1916, to Jan. 1, 1917. The bonus system went into effect Jan. 1, 1915, and is payable to the men every three months, averaging about 12½ per cent of the net profits of the company.

The Woonsocket Machine & Press Co., Woonsocket, R. I., announces that it has decided to put in operation a profit-sharing plan whereby all men in executive positions will be given a share of the profits of the business, the same to be retained and funded for them and invested in the preferred stock of the company.

About 150 casters' helpers, employed at the Waterbury, Conn., plants of the American Brass Co., struck Aug. 8. They demand an increase in wages. The casting shops of the Waterbury Brass and the Benedict & Burnham branches of the American Brass Co., are closed as a result of the strike.

Every foreman in the employ of the North & Judd Mfg. Co., New Britain, Conn., has received a bonus of 10 per cent of his earnings for the year ending July 1. In many cases the checks amounted to more than $100. The granting of the unexpected bonuses is another sign of prosperity the company has enjoyed this year.

Complete Report

On South American Machinery Markets Will Follow Investigation

A complete report on the markets for construction materials and machinery in South America is to be made by the bureau of foreign and domestic commerce, and in its preparation a representative of the bureau will conduct an investigation covering all the southern republics.

The bureau intends to offer for the benefit of American business men such information and recommendations as will lay a substantial foundation for trade extension in the lines mentioned. For the important work to be done it has selected William W. Ewing, who has had 27 years' experience in engineering and construction work, four of which were spent in foreign countries, and who is a member of the American Society of Civil Engineers and the American Society for Testing Materials.

In investigating constructive materials, attention will be given to markets for products used in building work, heavy engineering construction, and port and road projects, while the construction machinery on which information is desired includes devices, equipment and apparatus usually employed in such work. This is one of the 20 important investigations to be conducted this year by the bureau in the interest of American foreign trade.

Mr. Ewing will spend the next three months visiting the principal cities of the United States and conferring with manufacturers with regard to the work he will do in South America. Conferences with him may be arranged and suggestions are invited. Correspondence should be directed to the division of commercial agents, bureau of foreign and domestic commerce, department of commerce, Washington, D. C.

The Damascus Bronze Co., Pittsburgh, has purchased a factory building at 927 Reedsdale street, Pittsburgh, together with a lot, 50 x 100 feet.

Business News of Nation's Capital

Webb Bill May Be Rushed Through Congress in Closing Hours of Session

—Extensive New Construction Plans for the Navy

THERE is some promise for the enactment at this session of Congress of at least one constructive piece of business legislation. This is the Webb bill, permitting the organization of co-operative selling agencies among exporters in order that they may meet foreign competition on equal terms in international commerce.

The bill is now on the house calendar, having been reported favorably by the house judiciary committee. Strong pressure in behalf of its passage is being exerted by chambers of commerce, trade organizations, and the press. Little opposition of any kind has appeared and there is a prospect that it may be rushed through both branches in the closing days of the session.

The house judiciary committee, in its report urging passage of the bill, says: "Our exporters are forced to meet sharp competition in the foreign trade. To successfully do this, it is necessary to have the most expert representatives abroad and to thoroughly advertise our goods. A few of our large enterprises may be able to stand such expense alone, but our smaller producers and manufacturers cannot. This would, however, be made possible by permitting a number of such concerns to combine in employing one selling agency. While one small concern could not maintain a selling agency at a cost say, of $100,000 a year, 50 such concerns might be able to bear one-fiftieth of this expense each. One prime result of the common selling agency would be to reduce the cost of marketing the produce and to that extent help the exporter's profits and enable him the more easily to meet foreign competition."

Great Naval Program

Washington, Aug. 22.—The action of the house last week in accepting, by a vote of 283 to 51, the senate navy construction program, virtually completes the national defence legislation of congress at this session. The joint conference committee report on the navy bill is still to be acted on as a whole, but there is now no doubt that the measure as passed by the senate will be enacted into law.

The program calls for the construction of a total of 157 new navy vessels in the next three years at an aggregate cost of $588,000,000. The expenditures authorized for the fiscal year ending July 1, 1917, total nearly $316,000,000.

Secretary of the Navy Daniels issued a statement on the day the house approved the senate program saying that the constructions authorized in the bill were the greatest ever made by any nation in any one year and in the opinion of naval authorities would insure the United States navy the rank of second in size among the navies of the world powers.

The eight capital ships, four dreadnaughts and four battle cruisers, to be constructed at once, will carry the heaviest types of guns and are expected to surpass any capital ships yet constructed by any nation.

The three-year program will give the navy the following additional units: 10 dreadnaughts, six battle cruisers, 10 scout cruisers, 50 torpedo boat destroyers, nine fleet submarines, 58 coast submarines, three fuel ships, one repair ship, one transport, one hospital ship, two destroyer tenders, one fleet submarine tender, two ammunition ships, and two gun boats.

Small Tax Dropped

Washington, Aug. 22.—As sort of an apology for the munitions tax, the bill as reported by the committee exempts all corporations paying a munitions tax from the license tax of 50 cents on each $1,000 of capital, surplus and undivided profits which is imposed on corporations generally as another means for raising the much-desired revenue. Corporations subject to this tax, however, are allowed an exemption of $99,000 of capital, surplus and undivided profits.

The senate committee's change in the income tax is confined mainly to adding three new classifications to the surtax provisions of the house bill, thereby increasing the estimated revenue from the income tax by $2,500,000 annually. This is done by increasing the surtax to a maximum of 13 per cent on net incomes of more than $2,000,000.

The committee, on instructions from the caucus, also added certain new classifications to the estate or inheritance tax section, thereby increasing the house rate from a maximum of 5 per cent to a maximum of 10 per cent. The house bill provided five classifications, the maximum being 5 per cent on the net value of estates in excess of $450,000. The senate committee adds new classifications and raises the maximum to 10 per cent on estates of $5,000,000.

The total annual revenue expected to be derived from the senate committee's bill is $205,000,000.

The Revenue Bill

Washington, Aug. 22.—There is something wierd and mysterious about the mental processes of the majority members of the senate finance committee in framing its report on the amended revenue bill.

Under the graduated scale of taxes on gross receipts from the manufacture of munitions, ranging from 1 to 5 per cent, as imposed by the bill which passed the house, the total annual revenue to be derived therefrom was estimated by the ways and means committee at $71,000,000.

But as amended in the Democratic caucus of the senate and reported by the finance committee, only $41,000,000 is estimated to be derived during the fiscal year of 1917 from a 10 per cent tax on the net profits from arms and munitions and a 5 per cent tax on the net profit from the materials which enter into their manufacture.

In their formal report on the bill, the majority members of the committee do not reveal the methods of their calculation. In fact, it contains little to indicate that there was a method. Members interviewed on the subject were unable to throw any light on the subject and the suspicion was given credence that the committee, obedient to the action of the party caucus, had recommended the 10 and 5 per cent net profit taxes without the slightest idea as to whether they would produce $40,000,000 or $140,000,000.

It is not unlikely that the truth of the matter may be brought out on the floor when the revenue bill is called up for passage in the senate this week.

The only information vouchsafed the public as to the committee and caucus deliberations on the munitions taxes is contained in the following paragraphs from the committee's report:

"The house bill imposed a tax upon the manufacturers of munitions, upon the basis of a graduated percentage of

the gross receipts of all such persons and corporations. It also imposes a tax upon the gross receipts from the manufacture or sale of copper, brass and other alloys, whether used in the manufacture of munitions or not. It did not provide for the payment of a tax by a subsidiary manufacturer or subcontractor. Your committee thought it just that subcontractors as well as contractors should pay whatever tax was imposed by this title.

"After due consideration your committee reached the conclusion that a net-profit tax would be a more just and equitable method of taxation than a gross-receipt tax, as proposed in the house bill. They have therefore amended the bill so as to provide for a tax to be levied upon the basis of net profits.

"Your committee also recommends that the bill be so amended as to eliminate the tax imposed upon copper, and as a substitute for that portion of the bill they recommend a tax upon corporations selling or manufacturing materials actually entering into and used in the manufacture of munitions as specified in the bill. Your committee believes that there should be a difference between the rate of tax imposed upon a finished munitions and upon the materials used and entering into its manufacture and they therefore recommend that the tax upon munitions be fixed at 10 per cent and that upon materials at 5 per cent of the net profits. Your committee further amends the house bill by confining this tax to corporations manufacturing munitions and corporations manufacturing or selling materials for use in the manufacture of munitions."

Protests of Steel Men

Washington, Aug. 22.—The protests of iron and steel men against the proposed adjustment by transcontinental railroads of rates on iron and steel articles from eastern shipping points to the Pacific coast and intermediate destinations are directed against numerous extreme increases over the rates now in effect.

Because of the volume of protests by jobbers and wholesalers in other industries, the suspension board of the interstate commerce commission, which began hearings last week, has not yet reached a discussion of the iron and steel schedules.

The tariffs, filed to become effective Sept. 1, would establish a blanket rate on iron and steel products from the Atlantic to the Pacific coast of 94c per 100 pounds. At present, the rate from Chicago on structural material is 55c, from Pittsburgh 65c and from New York 75c. The intermediate rate proposed from Chicago is $1.01 and from Pittsburgh it is $1.08. From the Missouri river to the Pacific coast and intermediate points, the proposed rate is 79c.

The joint tariff proposing these new rates has been filed with the interstate commerce commission by Agents Countiss, Morris and McCall. It was filed as the result of the recent order of the commission in the so-called intermountain case by which the railroads were authorized to increase rates by reason of the disappearance of water competition through the Panama canal. Intermediate consumers had protested to the commission that rates they were being charged resulted in discrimination against them in favor of coast interests, and the order of the commission was designed to equalize the situation as between the two groups of consumers.

Ship Purchase Bill Passed

The senate passed the administration ship-purchase bill Friday night, 38 to 21, after incorporating several amendments adopted at the caucus of Democratic senators. All of the opposing votes were cast by Republicans, while all of the votes for the bill were cast by Democrats. Thirty-six senators did not vote.

Senator Harding, of Ohio, leading the opposition, denounced the bill as a blow at American shipping and ship building, particularly on the Great Lakes. He offered amendments to exempt Great Lakes shipping from the operation of the bill and to strike out the provisions permitting the federal shipping board to buy foreign-built ships and put them into competition with American-built ships on the lakes and along the coasts. The amendments were defeated, the Democratic majority lining up almost solidly against them. Among the caucus amendments adopted by the majority vote before the final roll call were those containing the following provisions:

The government is not to purchase any ship flying the flag of a belligerent nation or any ship already engaged in American trade unless it is about to be withdrawn from that trade.

No ship shall be acquired by the government which is below 75 per cent of its original efficiency.

The government must not undertake to operate merchant ships unless all efforts fail to negotiate satisfactory leases or sales to private corporations. The government reverses the right to prescribe conditions under which its ships shall be operated by private concerns and in what service they shall engage.

The bill as passed specifically authorizes foreign-built vessels admitted to American registry or enrollment and license, under the provisions of the act, to engage in the shipping of the United States.

Senator Harding, in a speech vigorously denouncing this provision as imperiling the Great Lakes ship building industry, said:

"I want, as a citizen of Ohio, bordering on the Great Lakes, to utter my protest against any such action on the part of the senate. We are so well established, so well satisfied with the service, so proud of the accomplishment, that we do not want the paralyzing federal arm to reach out and take it under the provisions of this bill, which I believe is designed to destroy rather than to upbuild American shipping."

Offered Sites. — The Follansbee Bros. Co., Follansbee, W. Va., which has considered the erection of an addition to its plant, has been offered several sites in West Virginia and Ohio. More than $37,000 was raised by citizens of Toronto, O., for the purchase of a site, which has been offered to the company. It has not however, adopted any definite plans with reference to increasing its capacity.

A dispatch from Berlin states that the Rumanian States railways has contracted with the German Steel Works Union for from 25,000 to 30,000 tons of rails.

The Northern Connellsville Coke Co. has been purchased by several men living in Connellsville, Pa. The plant is located near Greensburg, Pa. Officers elected are: President, F. E. Markell; vice president, Cyrus Echard; secretary, G. W. Campbell; and treasurer, J. W. Buttermore.

A contract has been awarded to the Nickson-Duggan Construction Co., Bailey building, Philadelphia, for an 11-story office building and power house, including the tearing down of the buildings now on the site. The Scofield Engineering Co., Philadelphia, is the engineer. The contract price is $300,000.

The Laconia Car Co., Laconia, N. H., has been awarded a contract for the trucks for 100 center-entrance motor cars recently ordered by the Boston Elevated Railway Co. This brings unfilled business on its books up to considerably above $2,000,000, as compared with less than $500,000 when the present company was organized in 1912.

Iron and Money: Fact and Comment

United States Steel Common Establishes New High Record for All Time—

Other Leading Iron and Steel Shares Are Strong and Active

ADVANCING prices and great activity have characterized the market for the shares of the United States Steel Corporation and all the leading independent iron and steel companies the past week. On Monday, Aug. 21, Steel common closed at 95, the highest level it has ever attained, just passing the previous high record of 94⅞, established seven years ago. Other steel shares performed similar feats. Republic preferred, Brier Hill common and La Belle common were among the bright spots of the market on the New York and other stock exchanges lately. The Republic Iron & Steel Co. has declared an extra dividend of 4 per cent on account of back dividends, which leaves only 4 per cent in arrears.

In view of the present unparalleled earnings of the large steel companies, the present rise undoubtedly is fully warranted. The surprising feature of the movement is that it should have been so long delayed, as present profits and prospects have been an open book to the public for months. And what is more, Wall street picked a moment for a bull market when a serious railway labor dispute was overhanging the country, threatening to evolve a strike which would be most disastrous to all business interests. Aside from the railway wage situation, the principal factors in the financial situation are the crop outlook, steady imports of gold, rapidly rising bank reserves, and the possible effect of the British collateral loan on further European sales of our railroad shares.

Quotations on leading iron and steel stocks at the close of the New York stock exchange on Aug. 19 and net changes for the preceding week are shown in the following table:

	Close Aug. 19.	Net chg.
American Can	59⅛	+2⅜
American Can, prfd.	111	— ½
Amer. Car & Fdy.	61¼	+1¾
Amer. Car & Fdy. Co., pfd.	117	.....
American Locomotive	72⅛	— ⅜
American Locomotive, prfd.	104	+ ⅜
American Steel Foundries	54½	+2¼
Baldwin Locomotive	73⅝	+3
Baldwin Locomotive, prfd.	105	— ⅜
Bethlehem Steel	469½	+25½
Bethlehem Steel, prfd.	135	+9
Colorado Fuel & Iron Co.	48	+3¼
Continental Can	99	— ¼
Crucible Steel	78	+ ¾
Crucible Steel, prfd.	118	+1½
General Electric	170¼	+1½
Gulf States Steel	78	+4½
Gulf States Steel, 2d prfd.	87½	+4½
International Harv. of N. J.	115½	+1½
International Harv. Corp.	78½	.....
Lackawanna Steel	75½	+4½
Nat'l Enamel'g & Stmp. Co.	23	.....
Pressed Steel Car	52¾	+3
Pressed Steel Car, prfd.	99¾	— ⅛
Pullman Palace Car	167	+3½
Republic Iron & Steel	51	+3¾
Republic Iron & Steel, prfd.	113	+2
U. S. Cast Iron Pipe & Fdy.	21½	+1⅜
U. S. C. I. P. & Fdy., prfd.	53	—1¼
United States Steel	91¼	+3⅜
United States Steel, prfd.	118	— ⅛
Westinghouse Mfg.	59⅛	+ ⅞

Following is a table comparing maximum quotations of iron and steel stocks not listed on the New York stock exchange at the close Aug. 18 and Aug. 11:

	Aug. 18	Aug. 11
American Radiator	392	...
American Ship Building	50	47⅞
Cambria Steel	82	...
Chicago Pneumatic Tool	69	67½
LaBelle Iron Works	54⅜	54
Lake Superior Corporation	10⅞	10¾
Stewart-Warner Speed. Co.	105	103½
Westinghouse Air Brake	143¾	...
Westinghouse Elec. & Mfg.	60	58½

Thomas Iron Co. Reports Larger Income

The Thomas Iron Co., Hokendaua, Pa., has just issued a pamphlet report covering operations of its sixty-second fiscal year, ended June 30, 1916. The company shows a net income for the year of $72,512, comparing with a net income the previous year of $37,902. Losses from pig iron sales, inactive plants and iron ore sales amounted to $99,372, whereas losses the previous year were $122,858. In the previous year a slight profit was made on iron sales. The company's large income from its investments, however, enabled it to show a profit both years. While at first glance the last year's showing may appear rather discouraging in view of the more satisfactory pig iron market, the report discloses the interesting fact that the company's property value was increased by $95,745 during the year. Much needed repairs were made to blast furnaces and mines, in order to bring these properties to a more efficient operating basis. As President Ralph H. Sweetser pointed out, the Thomas Iron Co. has no mills for the consumption of its pig iron, while its iron ore mines are not far enough advanced in equipment and development to furnish a large enough percentage of the ore the company needs to reduce the cost of making pig iron. The income accounts for the past two fiscal years compare as follows:

	Yr. end. June 30: 1916.	1915.
Net revenue, from:		
Cinder sales	$4,117	$4,606
Farms	1,249	415
Rents	5,577	1,906
Coal, labor, etc.	3,701	1,684
†Divs. and bonds	157,238	148,566
From ore sales	.....	3,582
Gross income	$171,885	$160,761
*Oper. exp. of furns.	2,527,893	826,683
Rev. from pig iron sales.	2,428,777	710,964
Net loss, iron sales	$99,116	$115,719
Net loss, ore sales	255	.....
Total loss from product	$99,372	‡$122,858
Net income for year	72,512	37,902

*Including expenses of inactive plants.
‡Including $7,141 loss from stock iron sold.
†Income from dividends of the Ironton R. R. Co., Catasauqua & Fogelsville R. R. Co., Mount Hope Mineral R. R. Co. and Thomas R. R. Co. Also interest on time deposits and bonds.

Financial Crop Ends

The Pennsylvania Forge Co., Philadelphia, manufacturer of steel forgings, advises its recent increase in capital stock, from $100,000 to $200,000, is due to an increase in business. The capacity of the company's plant has been doubled in the past year.

* * *

Shareholders of the American Fork & Hoe Co., Cleveland, who attended the annual meeting last week, reported that the year's results surpassed any previous year in the history of the company. No figures were given. The company has never made public its earnings.

* * *

The Standard Metalwork Co. Thompsonville, Conn., manufacturer of bent and tapered tubing for automobiles, flying machines, motor boat engines, etc., also sheet metal work, advises it was recently incorporated to take over a corporate company of the same name and enlarge its scope. At present the company does not contemplate building additional capacity.

* * *

The Roanoke Steel Co., Roanoke, Va., recently organized by Pittsburgh interests, has purchased the properties of the Loucks Iron & Steel Co., known as the Roanoke Rolling mills, near Roanoke. The site consists of about 12 acres. The main mill building is 87 x 305 feet and houses puddling furnaces, finishing mills and motor equipment. Fifteen double puddling furnaces, with a 22-inch, 3-high muck mill, are located in a building 85 x 340 feet. The plant has a capacity of about 50 tons a day. The company will manufacture a diversified line of merchant bar iron. Officers of the Roanoke company are: President, John Robinson, of Pittsburgh; treasurer, W. L. Jack, president of the Economy Gas & Service Co., Pittsburgh; the directors are: E. Chesrown, H. D. Stallnaker, Pittsburgh representative of the Ohio Iron & Metal Co., and Stephen G. Porter, secretary of the Firth-Sterling Steel Co., all of Pittsburgh.

Electrical Engineers to Meet

The Association of Iron and Steel Electrical Engineers has made arrangements to hold its tenth annual convention in Chicago, Sept. 18 to 22. The headquarters will be at the La Salle hotel. The program for the five-day meeting includes a joint session with the American Institute of Electrical Engineers and an annual banquet and ball. Arrangements have been made for the inspection of the power stations of the Commonwealth Edison Co. and several steel plants located in Chicago and its vicinity. The convention committee of which A. H. Swartz of the Cleveland office of the Westinghouse Electric & Mfg. Co., is chairman, announces that special entertainment will be provided for the ladies attending the convention. The program of papers which will be read at the various meetings is as follows: "The Value of Records to an Operating Engineer," by Ray S. Huey; "Cost Versus Upkeep of Direct-Current Motors," by A. M. MacCutcheon; "Central Station Power for Steel Mills," by the central station power committee, A. I. & S. E. E.; "Underground Distribution Systems," (A. I. E. E. paper) by George J. Newton; "The Unaflow Engine," by Prof. W. Trinks; "Steel Conductors for Transmission Lines," (A. I. E. E. paper) by H. B. Dwight; "The Advantages of Modern Types of Direct-Current Machines," by David Hall; "Mechanical and Electrical Operation of the Heroult Electric Arc Furnace," by Geo. W. Richardson; "Operating Characteristics of an Electric Reversing Blooming Mill," by E. S. Jefferies; "Control of Direct-Current and Alternating-Current Motors as Applied to Cranes," by Paul Caldwell; and "Portable Electric Tools as Applied to the Iron and Steel Industry," by A. M. Andresen.

Fighting for Business Men

Newark, N. J., Aug. 22.—The New Jersey Manufacturers' and Business Men's League, recently organized for the purpose of helping to elect more business men to congress, has appointed an advisory committee, a few of whose members are as follows: Charles S. Boyer, B. F. Boyer Co., Camden; Richard Denbigh, Hay Foundry & Iron Works, Newark; John W. Heins, Aeolian Co., Cranford; Albert C. Middleton, Victor Talking Machine Co., Camden; Walter C. Heath, Whitehead & Hoag Co., Newark; and Fred L. Eberhardt, Gould & Eberhardt, Newark. The league, which is giving particular support to ex-Governor Franklin Murphy, for the Republican nomination for United States senator, purposes to carry its campaign into every county of the state, warning wage earners, as well as manufacturers, that if prosperous times are to continue after the war, they must be guarded from the competition of cheap foreign labor.

Kissel Extensions

Hartford, Wis., Aug. 22.—The Kissel Motor Car Co., Hartford, Wis., has resumed its factory extension plan, which was halted 60 days ago because of the inability of contractors to get men in any division of the building trades. The need for more room is so urgent, however, that arrangements have been made to proceed with the work, and ground was broken early last week for two additions which will provide nearly 14,000 square feet of floor space. A one-story building, 77 x 123 feet, will be erected for the sheet metal department, and the three-story body shop erected last spring will be enlarged by a one-story addition, 40 x 100 feet. Other extensions the Kissel company has in view for fall and winter construction will add from 40,000 to 60,000 square feet of manufacturing space.

Exploring an Old Mine

Owen Conly, many years ago one of the foremost mining engineers in North Jersey, is now exploring the abandoned Ogden Mines, at Edison, Sussex county, N. J., to ascertain whether there is any prospect of getting any more material under the improved condition of the present day mining. A force of men is engaged in running diamond drills to great depths in the hope of finding enough ore to make the mines a paying proposition again.

Forty-five years ago Mr. Conly and Thomas Maley superintended the workings at the Ogden mines. During the open season for boating on the old Morris canal, a long train of ore was shipped daily over the Ogden Mine railroad, now a branch of the Central Railroad of New Jersey, to Nolan's Point on Lake Hopatcong, where it was received by the boats. Along the line of this road are the Dodge, Welden, Ford and Schofield mines, which furnished hundreds of tons of ore daily some 30 years ago. For the past 20 years, the workings have virtually been abandoned.

Democratic revision is apparently government of the people by the labor unions for the labor unions.—*Wall Street Journal.*

Called a Cur

In Hot Controversy in Canada in Regard to Nickel Policy

Toronto, Aug. 22.—The agitation for the refining of all Canadian nickel in Canada is increasing in intensity and has not been quieted by the steps being taken by the International Nickel Co. to establish a Canadian branch. Apparently those behind the movement will be satisfied with nothing short of an absolute embargo on the exportation of nickel ore. An election campaign to fill a vacancy in the Ontario legislature is now in progress in Toronto and the nickel question is being made the principal issue. The government is charged by the opposition speakers with furnishing to the Germans munitions of war to slaughter Canadian soldiers, and the statement is made that between 28 and 33 per cent of the stock of the International Nickel Co. is owned by the Krupps of Germany and held in the name of German-American trustees. Many who ordinarily support the Canadian and provincial government, are now opposing them on this question, which has apparently taken a strong hold on public sentiment.

Hon. G. Howard Ferguson, Ontario minister of mines, has taken the stump in defense of the government policy, replying to these attacks with a vigorous language which recalls the old-time campaign methods of a generation ago. He characterizes Hartley Dewart, the opposition candidate as "A low-down, contemptible cur," and lays the blame for the present situation on the former Liberal administration, which alienated the nickel mines. He stated that his government had been working out a plan for increased taxation of the mineral output and that it would be made retroactive so far as it affected the operations of International Nickel Co.

The recently-organized British Canadian Nickel Co., which proposes to establish a refinery near its mine at Copper Cliff, Ont., using the electric process, has obtained from the Ontario government a lease for the development of power on the Wahnapitae river in the neighborhood, the terms of which have not been made public. The company proposes to spend between four and five million dollars on this single development project.

The plant of the Standard Ideal Co., of Port Hope, Ont., manufacturer of plumbers' supplies, has been purchased by a new company, to be known as the Port Hope Sanitary Mfg. Co. for a price stated at over $1,000,000. The new company is capitalized at $1,250,000. L. M. Wood is president and R. J. Cluff vice president.

British Decree Hits Tool Makers

English Business Less Desirable Due to Tax Decision—Domestic Inquiry Slackens in East—Western Markets Quiet

THE machinery market shows a tendency to move less rapidly. A good business continues to be done, but now that the huge buying movement of large-swing lathes has about terminated, there are few developments of importance. Most of the inquiries from domestic sources involve one or two tools each, and the volume of such inquiries, according to reports received from machine tool interests generally, appears to be shrinking gradually. There are numerous inquiries which have accumulated during the past few weeks, but it is not known when action will be taken on them. The largest prospective business before the trade is that of the Bethlehem Steel Co., which has issued extensive lists of equipment for several of its plants, including those at Steelton, Pa., Sparrows Point, Md., and the main plant at South Bethlehem, Pa. It also is understood that this company will be in the market shortly for equipment for its Union Iron Works plant at San Francisco. Another important list is that of the General Electric Co., Schenectady, N. Y. The total inquiry involves about 30 tools, including presses, milling machines, drilling machines, and a number of lathes. It is expected that these requirements will be closed shortly. The Bridgeport Projectile Co., Bridgeport, Conn., it is learned, inquired about two weeks ago for a number of large-swing lathes and screw machines. It is not known whether this business was closed.

A slightly increased demand from Russia and Italy developed last week, which was offset by a falling off in business from England and France. American machine tool houses report that business booked by their agents in Great Britain is less desirable due to the order in council, which calls for payment to the government of 60 per cent of the profits arising out of all business transacted in that country. The undesirability of such business is especially emphasized in view of the understanding that, commencing Sept. 1, 95 per cent of all profits must be turned over to the British government. This order, naturally, applies to all British concerns, and to British agents or branch offices of concerns of American or other nationality; it does not apply to business not coming within the control of Great Britain, such as the orders placed directly in this country and not appearing on the books of branch offices, agents or dealers in Great Britain. Large American machinery companies say this new method of adding to British revenues will not cause them to close their branch offices in that country, since such offices, even if they do not take much business, will be useful in looking after the business previously booked as well as that placed here in the future.

Machine tool manufacturers are much interested in the government appropriations for extending and adding to the equipment of various arsenals, and also in the bill, now awaiting the signature of the President, calling for a much larger number of naval vessels than at first proposed. A big demand for heavy machine tools may be expected to develop. In view of the extent to which such tools are sold ahead, considerable difficulty will likely develop in obtaining suitable delivery.

One or two makers of grinders and shapers during the week have advanced their prices by approximately 10 per cent. These makers previously had been below the general market, and hence the advances do not indicate a movement toward higher levels than those at present prevailing. At the same time, makers of planers and some other tools continue to talk about probable advances in the near future.

The Bantam Anti-Friction Co., Bantam, Conn., has let a contract for a large addition. The International Coupler Co. has let a contract for a plant at Arcadia, Pa. The Electric Storage Battery Co., Philadelphia, has let a contract for an addition. The International Nickel Co. has acquired an additional site at Bayonne, N. J. The Chester County Motor Co., Coatesville, Pa., manufacturer of gasoline motor trucks, has leased a plant at Cherry and Fifty-eighth streets, Philadelphia, and will remove to the new location. The Smith-Winchester Mfg. Co., South Windham, Conn., is about to erect a machine shop. The Monarch Machine Co., 249 North Third street, Philadelphia. is about to build a machine shop. The Reading Steel Casting Co., Reading, Pa., will build an extension to its foundry. The Baltimore Tube Co., Baltimore, will build an addition. The American Brake Shoe & Foundry Co. will build an extension at Erie, Pa. The Edward G. Budd Mfg. Co., Philadelphia, maker of automobile bodies, will build several additions. The United Wire & Supply Co., Auburn, R. I., is erecting a plant. The Hunter Car Sign Co., Flushing, L. I., N. Y., is building an addition.

Chicago Market Still Dull

MACHINE tool dealers in Chicago for the most part find business rather dull. This slack is attributed to the usual summer lull as well as to the lack of foreign inquiry, which has almost disappeared. A few dealers, however, are entertaining a fair volume of business from domestic sources and do not find the summer season has cut deeply into their sales. One feature of the local territory is a slackening of the second-hand equipment market. Somewhat greater ease in obtaining new machines accounts for this change and the high price asked for used machinery is another factor. Some dealers who overbought have considerable second-hand machinery, which is not moving and on which they may meet a loss. Better deliveries are being made on lathes and screw machines, but it is difficult to obtain grinders and milling machines, which are in larger demand than other equipment. It appears that there was not as much expansion in plants producing these tools as was believed and inquiry comes from a wide field, with resulting deferred deliveries. While no general advances have been made recently, one concern manufacturing shapers has increased its prices about 10 per cent over the former level.

Pittsburgh Outlook Brighter

SALES of machine tools and heavy rolling mill equipment in the Pittsburgh district are now heavier than at any time in several months. Orders booked in the first three weeks of August are larger than those received in the corresponding period of

If the Axle should break what would happen to the Load?

—and what "kind words" would the Owner and everybody else say about the Machine?

After you have learned the ***real facts,*** you will not be surprised that so many automobile and auto-truck manufacturers ***insist*** upon "AGATHON" STEELS for all places where breakage is possible—especially for ***axles, crank shafts, drive shafts, connecting rods, transmission gears,*** etc.

We wish to make you acquainted with the ***real*** facts. Are you willing? WRITE US.

AGATHON STEELS

"AGATHON" Special Analyses
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"AGATHON" Chrome Steel
"AGATHON" Chrome Vanadium
"AGATHON" Nickel Steel

THE CENTRAL STEEL COMPANY

MASSILLON, OHIO

DETROIT OFFICE—326-27-28 Ford Building, F. Walter Guibert, District Representative
CLEVELAND OFFICE—Hickox Building, The Hamill-Hickox Co., District Representative
CHICAGO OFFICE—Room 1511-12 Lytton Bldg., East Jackson Blvd.
A. Schaeffer, District Representative
PHILADELPHIA OFFICE—902 Widener Bldg., Frank Wallace, District Representative

July. The Canadian Fairbanks Morse Co., Montreal, Que., has been buying machinery in the Pittsburgh market for shellmaking purposes and recently closed contracts for 25 large lathes. The Pittsburgh Sheet & Tin Plate Co., Pittsburgh, operating a tin plate mill at Marietta, O., plans to install six additional tin plate mills and will buy considerable auxiliary equipment. The Follansbee Bros. Co., Pittsburgh, plans a new tin plate mill near Follansbee, W. Va. The H. Koppers Co., Pittsburgh, has awarded contracts to the Robins Conveying Belt Co., New York, for coal conveying equipment for installation at the by-product coke oven plant of the American Steel & Wire Co., Cleveland. The American Bridge Co. is asking bids on special equipment for handling blooms for a 1,000-ton forging press in its plant at Gary, Ind. The specifications call for a machine having a capacity of 32,000 pounds.

Want Second-Hand Tools at Cincinnati

INQUIRY for second-hand machine tools in the Cincinnati market is good. This is because users desire immediate deliveries, which cannot, as a rule, be given by machine tool builders. Shipments are better than a year ago, at which time order books were full for more than six months in advance. Today certain shops can ship lathes, drills and milling machines within one or two months after receipt of orders. The center of interest in machinery circles in southern Ohio is the threatened strike of machinists in Dayton. It is understood that an effort will be made to involve machinists in each shop in Dayton, with the exception of the National Cash Register Co. Employers are of the opinion that, since machinists in Dayton, especially those employed in munition plants, are receiving better wages than in surrounding cities, the strike will be a failure. It is understood that demands of the strike promoters call for regulation of woman labor and increased wages. A number of women are working in munition plants in Dayton.

Small Orders Rule Cleveland Market

THE activity of the Cleveland machine tool market is limited almost entirely to small orders. Single tools have been placed freely during the past week. The total sales concluded were a little above the usual average. It has been noticed that inquiries from the east have appeared in the local territory with considerable regularity. The latest list which has been made public is that issued by the Wahlstrom Tool Co., 346 Carroll street, Brooklyn, N. Y. This concern is making inquiries for equipment for one of its customers. The following machines are desired: Two 6-foot radial drill presses with variable speeds; three 5-foot radial drill presses with variable speeds; three 4-foot presses with variable speeds; three Baker, heavy-duty, high-speed drill presses. All communications should be addressed to A. P. Phillips, manager.

The conditions which have characterized the Cleveland market for the past two weeks with regard to milling machines, cylindrical grinders and boring mills continue. It is very difficult to secure these tools for reasonable delivery. Large-swing lathes are easier to obtain and deliveries which were quoted at 60 days last week have been reduced to 30 and 45 days with an occasional machine offered for shipment within 15 days.

New Construction and Equipment

What it is **Where it is** **Who's doing it**

Among New England Factories

BANGOR, ME.—E. Listerness, engineer, 116 Exchange street, is preparing plans for a hydro-electric plant to cost about $50,000.

HOWLAND, ME.—The Howland Pulp & Paper Co. contemplates adding a concrete dam, steel penstocks, boilers, etc., to its plant at a cost of $150,000.

PORTLAND, ME.—The United Securities has been incorporated to make products of iron, steel, copper, brass, etc. The company is capitalized at $50,000 by Fred M. Phillips, K. M. Phillips and Florence E. Tarr.

PORTLAND, ME.—The Motor Car Transportation Co. has been incorporated to make railway freight cars and railway equipment. The company is capitalized at $50,000 by Albert F. Jones, George S. Soule and J. P. O'Donnell.

PORTLAND, ME.—The Campbell Transmission Co. has been incorporated to make transmission gears and automobile and machine parts. The company is capitalized at $250,000 by Albert F. Jones, A. B. Farnham and George S. Soule.

PORTLAND, ME.—Bids close Sept. 5 for a brick and steel, fireproof, 2-story and basement, steerage barracks and a 1-story storehouse to cost $67,500 for the United States government to be used as a quarantine station on House island.

PORTLAND, ME.—The Rumford Electro Alloys Co. has been incorporated to make products from iron, steel, manganese, copper or other minerals. The company is capitalized at $200,000 by Josiah H. Drummond, Charles M. Drummond, Wadleigh B. Drummond, G. M. Horne and Fred V. Matthews.

FRANKLIN, N. H.—Chas. T. Main, architect, 201 Devonshire street, Boston, is preparing plans for a 1-story, 70 x 140-foot mill addition to be erected at Franklin for the M. T. Stevens Son Co., North Andover, Mass.

MANCHESTER, N. H.—Plans are being prepared for a brick, 4-story building for the New England Telephone & Telegraph Co. at Vine and Concord streets.

RUTLAND, VT.—The Berlin Construction Co., Berlin, Conn., has started work on a brick and steel fireproof addition to be used as a sealing room and machine shop at the works of the Howe Scale Co. A 10-ton traveling crane will be installed.

WINDSOR, VT.—The Cone Automatic Machine Co. has been incorporated with $200,000 capital by Frank L. Cone, Cecelia F. Grelinais and Harry M. Davis.

BOSTON.—Moses Richmond has awarded a contract for a 4-story, 80 x 114-foot garage to cost $60,000 at 142-146 Dover street.

BOSTON.—The Hunt-Spiller Mfg. Corporation will build a brick, reinforced concrete and steel, 1 and 2-story, 50 x 70-foot addition to its foundry at 383 Dorchester avenue, South Boston.

BOSTON.—Lockwood, Greene & Co., engineers, are taking bids for a reinforced concrete, 7-story, 100 x 160-foot factory to be erected in Montreal for the Thompson-Norris Co., Niagara Falls, Ont.

BROCKTON, MASS.—The Labor Lyceum Association will build a brick, 4-story, 56 x 90-foot building to cost $60,000 at Crescent and Otis streets.

BROOKLINE, MASS.—The Cadillac Auto Co. will build a terra cotta and reinforced concrete, fireproof, 4-story and basement, 70 x 268-foot building with a 70 x 234-foot ell on Commercial avenue.

CAMBRIDGE, MASS.—Plans are being figured for a brick and steel, 3-story, 101 x

123-foot building to cost between $50,000 and $60,000 for the Knights of Columbus.

CHELSEA, MASS.—Plans are being prepared for a brick and stone, 3-story and basement, 80 x 200-foot school for the city of Chelsea to cost $175,000.

CHELSEA, MASS.—Plans are being figured for a brick, 3-story, 42 x 50 x 125-foot factory to cost $30,000 for the Southwestern Cone Co., at 193 Williams street.

CHICOPEE, MASS.—Plans will be ready to figure about Sept. 15 for a brick, 3-story, 187 x 200 x 285-foot school to cost $60,000 for the city of Chicopee on Front street.

CHICOPEE FALLS, MASS.—The Excelsior Needle Co. has let a contract to W. A. Newton & Co., Springfield, for the erection of a 4-story, 50 x 81-foot needle factory addition.

EAST DEERFIELD, MASS.—The Boston & Maine railroad has let a contract for the erection of a new locomotive shop at East Deerfield.

EVERETT, MASS.—The Everett Factories Corporation has had plans completed by Alden C. Loring, architect, 53 State street, Boston, for a 4-story, 124 x 148 x 167-foot plant to be erected at Everett at a cost of $60,000.

FALL RIVER, MASS. — The American Thread Co. has let a contract for the erection of a 2-story, 116 x 200-foot mill addition.

FALL RIVER, MASS.—The United States Bobbin & Shuttle Co., Providence, R. I., has let a contract for the erection of a 3-story addition to its plant at Fall River.

HOLYOKE, MASS.—The city of Holyoke has awarded a contract to Louis J. Seiling, 171 Madison avenue, New York, for a reinforced concrete and steel bridge over East Dwight street, for $18,315.

HOLYOKE, MASS.—The E. H. Friedrich Co., sheet metal worker, has awarded a contract to the Casper Ranger Construction Co. for a mill-construction, 2-story, 60 x 110-foot addition to its plant on Race street.

LOWELL, MASS.—The Burgess & Lang Co. is about to begin work at Lowell on the erection of a 9-story plant to cost about $200,000.

MATTAPOISETT, MASS. — The Atsatt Mfg. Co. has been incorporated to make sheet metal wares with $5,000 capital by F. L. Ramsdell, John T. Atsatt and W. A. Atsatt.

MEDFORD, MASS.—Bids close Aug. 30 for a brick and stone, 3-story school building for the city of Medford to cost $125,000 at Washington and Park streets.

NEW BEDFORD, MASS.—W. T. Jones will build a brick, mill construction, 1-story, 70 x 100-foot addition to its mill on Nash road to cost $20,000.

PITTSFIELD, MASS.—The Kinney Woolen Mfg. Co. has let a contract for the erection of a 2-story, 60 x 200-foot woolen mill.

SOMERVILLE, MASS. — The Somerville Trust Co. has awarded a contract for a brick, 1-story and basement, 64 x 137-foot building at 406-408 Highland avenue.

SOMERVILLE, MASS. — Hannah M. Kingston will build a brick, steel and cement, fireproof, 2-story, 66 x 80-foot garage, factory and store building to cost $20,000 at 47 Day street.

SPRINGFIELD, MASS.—Geo. H. McClean, 77 Wight street, has let a contract for the erection of a 1-story, 22 x 100-foot plant addition.

SPRINGFIELD, MASS.—Bids close Sept. 1 for a brick, 6-story, 113 x 170-foot store and office building for Lyman W. Besse at Vernon street and Besse court.

SPRINGFIELD, MASS.—Harry L. Berman has been incorporated to deal in tools, etc., with $5,000 capital by Lillian Berman, Harry L. Berman and J. G. Gottesman.

WATERTOWN, MASS.—The Hood Rubber Co. will build a concrete, 1-story, 144 x 450-foot tire building, a brick and wood extension to mill No. 1, and a brick and steel, 80 x 80-foot extension to its boiler house at its plant in East Watertown.

WORCESTER, MASS.—The Linehan, Conover Co. has let a contract for the erection of a 6-story, 50 x 50-foot addition.

CRANSTON, R. I.—The United Wire & Supply Co. has started work on a brick and steel, fireproof, 1-story, 175 x 400-foot plant to cost $100,000 on Elmwood avenue to which its Pawtucket plant will be removed.

EAST PROVIDENCE, R. I.—The Mexican Petroleum Corporation, 120 Broadway, New York, has let a contract to Jos. McCormick, 315 Taunton avenue, for the erection of an oil distributing plant at East Providence.

EAST PROVIDENCE, R. I.—F. C. Stender & Co., Providence, have been awarded the contract to erect a reinforced concrete, 30 x 620-foot pier for two spur tracks at the plant of the Mexican Petroleum Corporation at Kettle point. Plans for buildings to cost $100,000 have not yet been figured.

PROVIDENCE, R. I.—M. S. Alper & Son will build a brick, mill-construction, 2-story and basement, 68 x 74-foot building at Allens avenue and Sayles street.

PROVIDENCE, R. I.—The Aberthaw Construction Co., Boston, has been awarded a contract for a brick and steel, 1-story, 72 x 170-foot building for the Brown & Sharpe Mfg. Co., at Leland and Promenade streets.

BRIDGEPORT, CONN. — The Bridgeport Pattern & Model Co. will build a 2-story factory in North Bridgeport.

BRIDGEPORT, CONN.—The A. H. Nilson Machine Co. will build a storehouse in the rear of its factory on Railroad avenue.

BRIDGEPORT, CONN. — The American Chain Co. will build a brick, mill-construction addition to its plant on Connecticut avenue.

HARTFORD, CONN.—The Whitney Mfg. Co. has awarded a contract to the J. H. Grozier Co. for a reinforced concrete, 4-story, 38 x 112-foot factory to cost $40,000 at Bartholomew avenue and Hamilton street.

NEW BRITAIN, CONN.—Plans are being prepared for a brick, mill-construction, 6-story and basement, 40 x 114-foot addition to the factory of the Beaton & Cadwell Mfg. Co. in the rear of 169 Main street.

NEW HAVEN, CONN.—B. Shambron is about to build a 1-story, 24 x 36-foot factory building.

NORWALK, CONN.—Plans are being prepared by Owens & Sisco, architects, Continental building, Baltimore, for a 3-story addition to the plant of M. N. Mayehoff & Co. at Norwalk.

STRATFORD SPRINGS, CONN.—C. A. Tinker and H. R. Butler, architects, 318 Main street, Springfield, Mass., are preparing plans for a 1-story worsted mill to be built at Stratford Springs by the Rhode Island Worsted Co. at a cost of $200,000.

WATERBURY, CONN.—Permits have been granted the American Brass Co., for a brick and frame, 111 x 203-foot factory, a 22 x 57-foot addition to its storehouse, a 105 x 140-foot building and a 35 x 37-foot addition to its storehouse at its plant at Crane and Freight streets.

WILLIMANTIC, CONN. — The Watts Laundry Machinery Co. will build a 1-story, 300 x 408-foot addition to its plant at West Main and Winter streets. A large traveling crane will be installed.

From the Alleghenies to the Sea

AMSTERDAM, N. Y.—Chalmers Knitting Co. has let a contract for the erection of a 7-story plant addition.

BATAVIA, N. Y.—The city council has let a contract to the Warsaw Construction Co., Warsaw, N. Y., for the construction of foundations for the new city pumping station and filtration plant.

BROOKLYN, N. Y.—W. Beckers Analine & Chemical Works, Ditmas avenue and East Eighty-third street, will build a 1-story, 80 x 110-foot addition.

BROOKLYN, N. Y. — Thode & Harvie, architects, 406 Ninth street, are preparing plans for a 1-story, 24 x 30-foot shop building to be erected for J. W. Sullivan.

BROOKLYN, N. Y. — Adriance Machine Co., 254 Van Brunt street, Brooklyn, has let a contract to the John W. Ferguson Co., Paterson, N. J., for the erection of a 10-story, 150 x 180-foot manufacturing plant.

BUFFALO.—S. Lichtman, 21 Grey street, has had plans completed for a 4-story, 55 x 135-foot plant addition.

BUFFALO.—Acme Pattern & Machine Co., in which Adam Shabtac, 39 Letchworth street, is interested, has let a contract to the H. P. Kehr Co. for the erection of a 2-story, 100 x 176-foot plant.

BUFFALO, N. Y.—Carle Motor Parts Co. has been incorporated to manufacture motors and engines. The new concern is capitalized at $10,000 by Harold Carle, Arthur L. Dixon and Joseph F. Maha, all of Buffalo.

HARRISON, N. Y.—Plans have been filed by the Crucible Steel Co. for the construction of a new boiler house to cost $25,000. The Driver-Harris Wire Co. also filed plans for the erection of an addition to cost $10,000.

HERKIMER, N. Y. — Standard Furniture Co. will erect a 50 x 50-foot power house.

JOHNSON CITY, N. Y.—The Binghamton Light, Heat & Power Co. is erecting a power plant at Johnson City along the Susquehanna river and the Lackawanna railroad. The new structure will be of brick and steel, 60 x 80 feet with a 200-foot stack. The plant will be equipped for an initial capacity of 7,500 horsepower. W. S. Barstow & Co., 30 Pine street, New York City, are the engineers.

LONG ISLAND CITY, N. Y. — Frank Braun, architect, 585 Ninth avenue, is about to prepare plans for a 75 x 100-foot factory and loft building to be erected for N. Nicholas Nehrbauer Jr., 580 Ninth avenue.

NIAGARA FALLS, N. Y.—The Titanium

Alloy Mfg. Co. has awarded the Peckham Construction Co. a contract for a machine shop to cost about $30,000.

PEEKSKILL, N. Y. — Southard-Robinson Co. is having plans prepared by Beverly S. King & Sons, architects, 103 Park avenue, New York City, for a 2-story, 100 x 115-foot stove and furnace plant to be erected at Peekskill at a cost of about $40,000. Geo. W. Robertson, 257 Water street, New York, is treasurer of the company.

SCHENECTADY, N. Y.—General Electric Co. has let a contract to D. Bennett & Son for the erection of a 1-story, 185 x 203-foot plant addition.

SYRACUSE, N. Y.—H. H. Franklin Mfg. Co. has plans for a 1-story, 16 x 38 x 60-foot dry kiln.

TOMPKINSVILLE, S. I., N. Y. — Louis De Jonge & Co., 446 Richmond turnpike, have let a contract for the erection of a manufacturing plant, power house and garage.

CAMDEN, N. J.—The Pezzeti Co. has been incorporated to manufacture wagons and automobiles. The company is capitalized at $125,000 by Henry Pezzeti, John J. Conway, Philadelphia, and Nicholas Squillace, Camden.

DOVER, N. J.—The Downs-Slater Foundry Co., Wharton, N. J., has secured a site at Dover and will erect several buildings on it. The main structure will be 40 x 100 feet.

ELIZABETH, N. J.—F. L. D. Smith & Co. will build a foundry addition at North avenue and Meadow street to cost $16,000.

JERSEY CITY, N. J.—The Chemical Pump & Valve Co. has been incorporated to manufacture pumps and valves. The company is capitalized at $30,000 by Frank O. Warter, Emil Warter, Perth Amboy, N. J., and Fred Batzel, South Amboy, N. J.

LAMBERTVILLE, N. J. — The city of Lambertville will receive bids soon for the erection of a 2-span steel bridge over the Lambertville river.

MAURER, N. J.—The Barber Asphalt Paving Co. has let a contract for the erection of an addition.

MORRISTOWN, N. J.—The Downs-Slater Iron Foundry Co. has been incorporated to do a general foundry business. The new company is capitalized at $25,000 by John W. Downs, Walter Slater, Charles M. Downs and Hannah Slater. The office of the company is at Wharton, N. J. The company will erect a plant on Salem street, Downs, N. J.

NEWARK, N. J.—The American Synthetic Dyes has taken out a permit for steel tanks to cost $8,300 and a wash and store house to cost $7,000. All will be built on Avenue R.

NEWARK, N. J.—The Armstrong Rubber Co. has been incorporated to manufacture tires. The new company is capitalized at $200,000 by George A. Armstrong, Rutherford, N. J., Samuel Kahn and John A. MacEwan, Newark.

NEWARK, N. J.—The Edward Maher's Sons Co. has been granted a permit to erect a 1-story brick addition to its foundry at 212 Berlin street. The addition will cost about $20,000 and will be 34 x 160 feet. The equipment includes a crane.

POMPTON LAKES, N. J.—The state board of health has approved the plans of the E. I. du Pont de Nemours Co. for a sewerage disposal plant to cost $10,000.

ALLENTOWN, PA.—Hersch & Bro., manufacturers of roofing and sheet metal, have let a contract for the erection of a 70 x 80-foot, 2-story addition.

ARCADIA, PA.—The International Coupler Co. of which R. White, 435 Wood street, Pittsburgh, is president, will build a 1-story, 50 x 175-foot plant at Arcadia.

BERWIN, PA.—The American Bronze Co. has let a contract for the erection of a 50 x 50-foot, 1-story machine shop.

CHESTER, PA.—The Chester Valley Electric Co. will enlarge its power plant at Chester.

CONNELLSVILLE, PA. — This city has awarded Lawrence & Critchfield, Somerset, a contract for a school to cost $137,823.

DERRY, PA.—Pennsylvania railroad has let a contract to the Chas. Peterson Co., Keystone building, Pittsburgh, for the erection of a 15-stall round house at Derry.

ELLWOOD CITY, PA.—The Bell Telephone Co. will erect a telephone exchange 25 x 48 feet, costing about $32,000.

HARRISBURG, PA.—The Jennings Mfg. Co. has let a contract for the erection of a 3-story, 52 x 125-foot factory building.

HARRISBURG, PA.—Dr. P. Kahras, Trustee building, contemplates building a 1-story, 32 x 72-foot plant at Quinton, N. J., for the Quinton Mfg. Co. and a 2-story, 32 x 70-foot plant at Orrtanna, Pa., for the Orrtanna Co.

HAZLETON, PA.—The Lewis Roessel Co. is about to build a 4-story, 54 x 200-foot and a 2-story, 27 x 70-foot silk mill addition.

JOHNSTOWN, PA.—The city of Johnstown plans to build a sewage disposal plant. Clark P. Collins is preparing the plans.

JOHNSTOWN, PA.—The Conemaugh & Franklin Water Co. plans to spend $100,000 for improvements to its plant.

MILLVALE, PA.—The Pittsburgh Railways Co. has awarded W. F. Trimble & Sons, 1719 Penn avenue, Pittsburgh, a contract for car barns to cost about $35,000.

MT. JOY, PA.—Geo. Brown Sons will build a 2-story, 60 x 245-foot plant. The plans are being prepared by R. H. Morris, architect, Commercial Trust building, Philadelphia.

NEW CASTLE, PA.—The Johnson-Bronze Co. has awarded the Anderson Construction Co. a contract for a foundry to cost about $85,000.

PHILADELPHIA.—Edwin Kirk, 1911 Market street, will build a 2-story, 43 x 200-foot factory and garage building.

PHILADELPHIA.—The Pennsylvania railroad will build a 1-story power and scale house at the foot of Reed street.

PHILADELPHIA.—The Albro Clem Elevator Co., Seventh street and Glenwood avenue, contemplates the erection of an addition.

PHILADELPHIA.—Wm. Lowenthal, architect, 1208 Chestnut street, has completed plans for a 1-story, 18 x 108-foot machine shop for P. J. Collins, 1301 North Second street.

PHILADELPHIA.—J. S. Hudson, Barbados, West Indies, is here to purchase ice-making machinery. He can be reached at the foreign trade bureau of the Philadelphia chamber of commerce, Widener building.

PITTSTOWN, PA.—The Pennsylvania railroad has let a contract for the construction of a power plant at Pittstown.

READING, PA.—Wm. H. DeCamp, engineer, Baer building, is preparing plans for rebuilding the plant of the Reading Chemical Co.

YORK, PA.—The Bell motor Car Co. will build a 1-story, 108 x 200-foot plant to manufacture automobile bodies.

DOVER, DEL.—The Gibson Furnace Co. has been incorporated to manufacture iron, steel and other metals. The new company is capitalized at $100,000 by Harry T. Farrow, Norman P. Coffin, Wilmington, Del., and Clement M. Enger, Elkton, Md.

Activities in the Central States

AKRON, O.—Plans for the new terminal station to be erected in Akron by the Northern Ohio Traction & Light Co. have been filed with the building inspector. The new terminal will be four stories and will contain machine shops, a power plant, storage rooms and offices and will cost $125,000.

CANTON, O.—The Effinger-Menegay Machine & Die Co. has been incorporated with $20,000 capital by Pierce H. Effinger, Albert L. Menegay, Ralph Staley, R. A. Motinger and J. M. Montgomery.

CHILLICOTHE, O.—The Arbenz Motor Car Co. has been incorporated with $1,000,000 capital by M. F. McFadden, E. C. Spader, M. C. Hayes, W. J. Purcell and R. I. Pillars.

CINCINNATI.—The Enger Motor Car Co. has been incorporated with $4,000,000 capital by Frank J. Enger, E. L. Jones, George W. Platt, E. C. Lincoln and Edward Richie.

CINCINNATI.—Special equipment for refrigerating purposes will be needed by the French Bros.-Baurer Co., which is about to begin the construction of a new plant to cost $250,000.

CINCINNATI.—The Charlton Machine Tool Co., recently incorporated, will build a factory building in Camp Washington, a suburb of Cincinnati. Definite plans have not been prepared.

CINCINNATI.—Considerable machine shop equipment will be needed by the Enger Motor Car Co. which has recently increased its capital stock to $4,000,000, and which will greatly enlarge its manufacturing facilities on Gest street.

CLEVELAND.—The Imperial Type Metal Co. has purchased a tract of land on Mulberry street from the Cleveland National bank, upon which a factory will be built.

DAYTON, O.—The Metals Machining Co. has been incorporated with $10,000 capital by Charles F. Dye, M. A. Sieg, M. W. Cole, H. M. Haller and George W. Ozias.

DAYTON, O.—The Meade Pulp & Paper Co. will build an addition to the plant of the Peerless Paper Co., which it recently leased. The addition will be of brick, three stories, and will cost $38,000. Frank Smith, engineer, is preparing the plans.

LORAIN, O.—The Lorain plant of the Lorain County Electric Co. will be doubled in capacity, according to announcements made by the officials of the company. The boiler plant will be equipped with modern stokers. turbine-driven generator will be installed. A 200-foot stack will be erected and the boiler plant will be equipped with omdern stokers. The total cost of the construction will be about $250,000.

MARION, O.—The Bellefontaine Bridge & Iron Co. is the general contractor for erecting a plant for the Power Mfg. Co. at Marion.

NAPOLEON, O. — The Napoleon Crown Fender Co. has been incorporated to manufacture fenders, hoods and stamped metal parts of automobiles. The incorporators are

Cyril Donnelly, L. W. Schultz, Gerald Donnelly and W. A. Bockelman.

NEW BOSTON, O.—Julian Kennedy, engineer, Bessemer building, Pittsburgh, is completing plans for the $1,000,000 blast furnace to be erected at New Boston for the Whitaker-Glessner Co., Wheeling, W. Va.

SPRINGFIELD, O.—The Western Foundry & Mfg. Co. has been incorporated with a capital of $10,000, by H. M. Siemendinger, C. O. Lutz, H. N. Pendleton, J. C. Howell and E. J. Shollenberger.

STEUBENVILLE, O.—Jefferson county is receiving bids for abutment and steel superstructure of the Atena bridge. J. L. Means is the county auditor.

TOLEDO, O.—The A. Bentley & Sons Co. are constructing a steel factory building for the Haughton Elevator Co. on Spencer street at a cost of $35,000.

YOUNGSTOWN, O.—The Trussed Concrete Steel Co. is preparing to build an extension to its plant. The addition will be of reinforced concrete construction, 40 x 800 feet. The contract for a portion of the building has been awarded to the Hunter Construction Co., Youngstown.

HUNTINGTON, W. VA.—J. S. Farr plans to build a 14-story office building to cost about $100,000. Meanor & Sweeney are preparing the plans.

MORGANTOWN, W. VA.—The University of West Virginia will build an agricultural building to cost $100,000. Special equipment will be needed, also fire proof doors and a small amount of structural steel.

RONCEVERTE, W. VA.—The Chesepeake & Ohio railroad plans a viaduct on Walnut street to cost about $35,000. F. I. Cabell, Richmond, Va., is the chief engineer.

FORT WAYNE, IND.—Harris & Richards, Drexel building, Philadelphia, have prepared plans for a 2-story, $75,000 factory building to be erected in Fort Wayne for the General Electric Co. Bids will be taken soon by the owners.

FRUITDALE, IND.—The Coey Auto school, 2010 South Wabash avenue, Chicago, will take bids soon for the erection of a 1-story, $50,000 automobile factory to be built in Fruitdale.

GARY, IND.—The Calumet Electric Co. is planning extensions of its transmission line to cost $75,000.

INDIANAPOLIS, IND.—The Metal Auto Parts Co. will build a plant costing $60,000. B. E. Thompson, 2443 Talbott avenue, is president.

INDIANAPOLIS, IND.—The National Motor Vehicle Co., Twenty-second street and Monon railway, will build a 3-story addition, 62 x 381 feet. George M. Dickson is the manager.

INDIANAPOLIS, IND.—The Union Tool & Die Co. has been incorporated to manufacture dies, castings and machinery. The company is capitalized at $10,000 by Dunward Rivers, C. J. McHugh and E. W. Holt.

INDIANAPOLIS, IND.—The Harold King Wrench Co. has been incorporated with a capitalization of $50,000 to manufacture wrenches and other machinery. The directors are Harold King, H. King and M. King.

INDIANAPOLIS, IND.—The Nerdyke & Marmon Co. has taken out a permit for the erection of a $30,000 building to be 225 x 600 feet, one story and of reinforced concrete construction with steel sash. This is the first of three buildings to be erected by the company at a total cost of $100,000.

KOKOMO, IND.—The Haynes Stellite Co., of which J. C. Palton, 601 Citizens' National bank building, is manager, will take bids soon for the erection of a 1-story, 60 x 120-foot factory building.

SOUTH BEND, IND.—The Sibley Machine & Tool Co., 206 East Tutt street, will build a 2-story addition, 28 x 66 feet.

WINCHESTER, IND.—The Beebe Glass Co., Richmond, Ind., has completed arrangements for a glass factory to be constructed in Winchester.

BEARDSTOWN, ILL.—The Burlington railroad, T. E. Calvert, 546 West Jackson boulevard, Chicago, chief engineer, will build a repair shop at Beardstown.

CHICAGO.—The Illinois Smoked Meat Co., 2710 Poplar avenue, has bought a site and will build a factory and warehouse costing $170,000.

CHICAGO.—The Sheet Metal & Conveyor Co. has been incorporated to manufacture sheet metal devices with $5,000 capital by Alfred J. Thompson, Georgiana Thompson and Herman F. Kroeplin, 8026 South Peoria street.

CHICAGO.—The Simpson-Frisch Co. has been incorporated to manufacture ornamental iron work. The new company is capitalized at $5,000 by T. M. McQuiston, Paul Frisch, 4737 North Rockwell street, and Henry W. Huttman, 5722 Winthrop avenue.

CHICAGO.—A. Goodrich, manufacturer, has been incorporated to manufacture emery, carborundum and other grinding wheels. The company is capitalized at $5,000 by Oscar A. Rose, Jacob E. Replogle and Bertram W. Rosenstone, 112 West Adams street.

CHICAGO.—The Hughes Electric Heating Co., manufacturer of electric heating devices, 215 West Schiller street, has bought a tract of land at West Taylor and Fifty-sixth streets for $33,000. The first unit of a modern plant will be erected shortly at a cost of about $150,000. Plans are being prepared by C. A. Eckstrom.

CHICAGO.—The Pyle National Electric Headlight Co., 900 South Michigan avenue, has bought a site at Hirsch street and Kostner avenue, on which a plant costing $250,000 will be built. The proposed plant will include a 2-story machine shop, 132 x 280 feet, a forge shop, 48 x 94 feet, a pattern shop, 48 x 62 feet, a power house, 48 x 62 feet, and a 1 and 2-story foundry, 79 x 236 feet.

JOLIET, ILL.—The Powdered Coal Enginering & Equipment Co. is planning to build a plant costing $225,000.

ANN ARBOR, MICH.—Bids will be received until Sept. 6 by the city clerk for a 2-span arch bridge, 170 feet, on Broadway.

DETROIT.—The Imperial Welding Co. has been incorporated with $15,000 capital by Gearge Christopulous and others.

DETROIT.—The Wallace Motor Mfg. Co. has been incorporated with $25,000 capital by Francis J. Wallace, Joseph G. Farley and Clifford J. Hinkley.

DETROIT.—George V. Pettle, architect, 1401 David Whitney building, is taking bids on the erection of a 1-story, 80 x 400-foot factory building for the Detroit Wire Spring Co.

LAKE ODESSA, MICH.—The Graham-Bell Co. will build a factory at Lake Odessa for the manufacture of brass valves.

LANSING, MICH.—Bids will be received until Sept. 6 by F. F. Rogers, state highway commissioner, for a steel bridge over the Huron river, consisting of one 130-foot, pratt truss.

MUSKEGON, MICH.—The Enterprise Brass Works is building a 3-story brick and steel addition, 50 x 150 feet, for manufacturing and machining plumbing supplies.

BLAIR, WIS.—E. J. Matchett and John Raichie, Osseo, Wis., have been awarded a contract for constructing the first half of the proposed steam railway of the Ettrick & Northern Railroad Co., from Blair to Ettrick, at their bid of $135,000. The contractors will purchase considerable additional steam shovel equipment.

CHIPPEWA FALLS, WIS.—The Chippewa Foundry & Machine Co., which recently increased its capital stock from $25,000 to $100,000, has started work on a new machine shop, 60 x 161 feet, and a foundry annex, 60 x 60 feet. The contract has been awarded to the Wisconsin Construction Co., Chippewa Falls.

GRAND RAPIDS, WIS.—The Soo Line has awarded a contract for the erection of a new passenger and freight depot at Grand Rapids to the W. A. Hansen Construction Co., Chippewa Falls, Wis. The work will cost about $45,000.

GREEN BAY, WIS.—The Overland-Green Bay Co. will begin at once the construction of a warehouse, garage and service station, 100 x 125 feet, two-story and basement. W. J. Calahan is the local manager.

KOHLER, WIS.—The Kohler Mfg. Co. will ask bids on a 1-story, 75 x 200-foot addition. Brush & Phillips, 506 Free Press building, are the architects.

MADISON, WIS. — The board of public works awarded a general contract for improvements to the municipal waterworks system and pumping station to John F. Icke, Madison. The work includes the construction of a 30-inch, class A, cast iron, equalizer pipe line, at a cost of $10,700.

MILWAUKEE.—The Jeaschke Bros. Foundry Co., 3026 Locust street, will build a 1-story addition, 40 x 100 feet.

MILWAUKEE. — Articles of incorporation have been filed by the Sanitary Refrigerating Machinery Co., Milwaukee. The capital stock is $100,000 and the incorporators are C. F. Schimmel, Louis Pierron and A. C. Lingelbach.

MILWAUKEE. — Herbst & Hufschmidt, architects, Milwaukee, are taking bids for the erection of a 2-story and basement, 55 x 141-foot addition to the plant of the J. Greenebaum Tanning Co. on Hampton avenue, North Milwaukee.

MILWAUKEE.—The Falls Motor Co., which has succeeded the Falls Machine Co., manufacturer of gasoline engines, woodworking machinery, etc., Sheboygan Falls, Wis., will start at once the erection of a new assembling shop, 60 x 180 and 60 x 120 feet.

MILWAUKEE.—A $20,000 addition will be erected by the Northwestern Lithographing Co., 1429 Clybourn street. The building will be 50 x 120 feet, three stories and of brick and steel. Plans have been prepared by A. C. Clas, architect, Colby-Abbot building.

MILWAUKEE.—The Chicago, Milwaukee & St. Paul Railway Co. has been granted a permit to build a new machine shop and millwrights' house at Elevator E, Milwaukee, leased by the Donohue & Stratton Co., which is making important improvements to the plant and equipment.

MILWAUKEE. — R. H. Pinkley, architect and enginer for the Milwaukee Electric Railway & Light Co., is preparing plans for a large addition to the car station on Oakland avenue. It will be of reinforced concrete and structural steel, 138 x 300 feet, one story, with a mezzanine floor. Bids will be taken late in August.

MILWAUKEE.—The Claus Automatic Gas Cock Co., 2601 Vilet street, has been granted a permit for erecting a new machine shop and brass foundry at Booth and Franklin streets. The general contract has been awarded to the Raulf Co., 53 Patton building. The unit will be of fireproof construction, 82 x 150 feet, one-story and basement.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Lower price to Jan. 1, 1917; higher to July 1, 1917.)

Bessemer valley	$21.00
Bessemer, Pittsburgh	21.95
Basic, Pittsburgh	18.95
Basic, eastern Pa.	19.00 to 19.50
Basic, Buffalo	19.00 to 19.50
Malleable, Pittsburgh	19.45
Malleable foundry, Chicago	19.50
Malleable foundry, Philadelphia	21.00 to 21.50
Malleable foundry, Buffalo	18.50 to 19.00
No. 1X foundry, Philadelphia	20.00 to 20.50
No. 2 foundry, Pittsburgh	19.45
No. 2 foundry, Cleveland	18.50 to 19.00
No. 2 foundry, Ironton	18.50 to 19.00
No. 2 foundry, Chicago	19.00
No. 2X foundry, Philadelphia	19.50 to 20.00
No. 2X foundry, N. J. tidewater	19.50 to 20.00
No. 2X foundry, Buffalo	18.50 to 19.00
No. 2 plain, Philadelphia	19.00 to 19.50
No. 2 plain, N. J. tidewater	19.00 to 19.50
No. 2 plain, Buffalo	18.25 to 18.75
No. 2 southern, Birmingham	13.50 to 14.50
No. 2 southern, Cincinnati	16.40 to 17.40
No. 2 southern, Chicago	18.00 to 19.00
No. 2 southern, Phila. delivery	18.50 to 19.50
No. 2 southern, Cleveland	18.00 to 19.00
No. 2 southern, New York docks	18.00 to 18.50
No. 2 southern, Boston docks	17.75 to 18.75
No. 2 south. interior, New Eng.	18.50 to 19.50
No. 2 southern, St. Louis	18.40 to 18.90
Virginia No. 2X, furnace	18.50
Virginia 2X, Philadelphia	21.25
Virginia, No. 2X, Jersey City	21.00
Virginia 2X, Boston points	21.75
Gray forge, eastern Pa.	18.00 to 18.50
Gray forge, Pittsburgh	18.95
Gray forge, Birmingham	12.50 to 13.50
Silveries, 8 per cent, furnace	24.00 to 27.00
Silveries, 8 per cent, Chicago	29.50
Low phos. Standard, Phila.	33.00 to 34.00
Low phos. Lebanon, Pa. furnace	29.00 to 31.00
Low phos. Pittsburgh	30.00 to 31.00
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	19.75 to 22.25
Charcoal, Buffalo	21.00 to 22.00
Charcoal, Birmingham	22.50 to 23.00

IRON ORE

Lake Superior Ores.
(Lower Lake Ports.)

Old range Bessemer, 55 per cent, ton	4.45
Mesabi Bessemer, 55 per cent, ton	4.20
Old range non-Bess., 51½ per cent, ton.	3.70
Mesabi non-Bess., 51½ per cent, ton	3.55

Eastern Ores.
(Per unit delivered eastern Pennsylvania.)

Pt. Henry fur., 60 per cent, unit	8.5c to 8.9c
Local N. Y. and N. J. ores, unit	8.5c to 8.75c
Port Henry lump, at mines, ton.	$4.00

Foreign Ores.
(Per unit Philadelphia.)

Foreign Bess., 50 to 65 per cent	nominal
For'n non-Bess., 50 to 65 per cent	nominal

COKE

(At the ovens.)

Connellsville furnace	$2.75 to 2.85
Connellsville fur., contract	2.40 to 2.50
Connellsville foundry, contract	3.15 to 3.40
Connellsville foundry	3.00 to 3.25
Wise county furnace, contract	2.85 to 3.25
Wise county foundry, contract	3.50 to 3.75
Pocahontas foundry, contract	3.25 to 3.75
Pocahontas furnace, contract	2.85 to 3.25
New River foundry, contract	3.75 to 4.25
New River furnace, contract	3.25 to 3.50

FERRO ALLOYS AND STEEL MAKING METALS

Ferro manganese, 80 per cent, seaboard, prompt	$170 to 175
Ferro manganese, 80 per cent, seaboard, contract	175
Spiegel, 20 per cent, fur. early and last half	45.00 to 50.00
Ferro-silicon, 50 per cent, Phil.	83.00 to 85.00
Ferro-silicon, 50 per cent, Pbgh.	83.00 to 85.00

Bessemer ferro-silicon, 9 per cent to 10 per cent, $32.00; 10 to 11 per cent, $33.00; 11 to 12 per cent, $34.00; 12 to 13 per cent, $35.00 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

SEMI-FINISHED MATERIAL

Open hearth billet, Phila	$47.50 to 50.00
Forging billets, Phila	65.00
Forging billets, Pbgh., nominal	65.00 to 70.00
Forging billets, Chicago	65.00
Wire rods, Pittsburgh (nom.)	55.00 to 60.00
Bessemer billets, Youngstown	45.00 to 46.00
Bessemer billets, Pittsburgh	45.00 to 46.00
Open hearth billets, Pittsburgh	45.00 to 46.00
Open hearth billets, Youngstown	45.00 to 46.00
Bess. sheet bars, Youngstown	45.00 to 46.00
Op. h'th sheet bars, Youngstown	45.00 to 46.00
Bess. sheet bars, Pittsburgh	45.00 to 46.00
Open hearth sheet bars, Pbgh.	45.00 to 46.00
Muck bars, Pittsburgh (nominal)	40.00 to 45.00

SKELP

Grooved steel skelp	2.50c to 2.60c
Sheared steel skelp	2.90c to 3.00c

RAILS AND TRACK MATERIAL

(Gross tons.)

Stand. Bess. rails, Pbgh. & Chg. delivery after May 1, 1917	$33.00
Stan. op.-h'th rails, Pbg. & Chg. delivery after May 1, 1917	35.00
Light rails, 8 to 10 lbs., Pbgh.	50.00
Light rails, 8 lb., Chicago	43.00
Light rails, 12 to 14 lbs., Pbgh.	49.00
Light rails, 12 lbs., Chicago	42.00
Light rails, 16 to 20 lbs., Pbgh.	48.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brooklyn (by canal)	1.25 to 1.60
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York, (r. and w.)	4.25
Philadelphia (all rail)	5.20
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

Light rails, 16 to 20 lbs., Chgo.	$41.00
Light rails, 25 to 45 lbs., Pbgh	47.00
Light rails, 25 to 45 lbs., Chgo.	40.00
Relaying rails, standard, Pbgh. and Chicago	$23.00 to 24.00
Relaying rails, light, Chicago	24.00 to 25.00
Angle bars, st. sect., Pbgh. base	2.00c
Angle bars, st. sections, Chgo.	2.00c to 2.50c
Spikes, railroad, Pittsburgh	2.65c to 2.75c
Spikes, railroad, Chicago	2.75c to 2.90c
Track bolts, Pittsburgh	3.25c to 3.50c
Track bolts, Chicago	3.25c to 3.50c
Tie plates, Chicago	50.00 to 55.00

SHAPES, PLATES AND BARS

Structural shapes, Pbgh.	2.50c to 2.60c
Structural shapes, Philadelphia	2.659c to 2.759c
Structural shapes, Chgo.	2.79c to 3.50c
Structural shapes, New York	2.669c to 2.769c
Tank plates, Chgo.	3.19c to 3.60c
Tank plates, Pittsburgh (con.)	2.90c to 3.00c
Tank plates, Pittsburgh	3.50c to 4.00c
Tank plates, Philadelphia	3.159c to 4.159c
Tank plates, New York	3.169c to 4.169c
Bars, soft steel, Chicago	2.79c to 3.50c
Bars, soft steel, Pbgh.	2.50c to 2.60c
Bars, soft steel, New York	2.669c to 2.769c
Bars, soft steel, Philadelphia	2.659c to 2.759c
Hoops, carloads, Pittsburgh	3.00c
Bands, Pittsburgh	2.60c
Shafting, Pbgh., contr. carloads	15 to 20 off
Bar iron, Chgo.	2.35c
Bar iron, Philadelphia	2.559c
Bar iron, Cleveland	2.40c
Bar iron, New York	2.569c
Bar iron, Pittsburgh	2.65c to 2.75c
Hard steel bars, Chgo.	2.50c

SHEETS AND TIN PLATE

(Differentials indicated below are not now being closely followed.)

Bessemer.

BLUE ANNEALED SHEETS PITTSBURGH

	Per lb.
Nos. 3 to 8	2.95c to 3.20c
Nos. 9 to 10 (base)	3.00c to 3.25c
Nos. 11 and 12	3.05c to 3.30c
Nos. 13 and 14	3.10c to 3.35c
Nos. 15 and 16	3.20c to 3.45c

Bessemer.

BOX ANNEALED SHEETS, COLD ROLLED PITTSBURGH

Nos. 17 to 21	2.55c to 2.80c
Nos. 22 and 24	2.60c to 2.85c
Nos. 25 and 26	2.65c to 2.90c
No. 27	2.70c to 2.95c
No. 28 (base)	2.75c to 3.00c
No. 29	2.80c to 3.05c
No. 30	2.90c to 3.15c

Bessemer.

GALVANIZED SHEETS OF BLACK SHEET GAGE, PITTSBURGH

Nos. 10 and 11	3.25c to 3.50c
No. 12	3.35c to 3.60c
Nos. 13 and 14	3.35c to 3.60c
Nos. 15 and 16	3.50c to 3.75c
Nos. 17 to 21	3.65c to 3.90c
Nos. 22 and 24	3.80c to 4.05c
Nos. 25 and 26	3.95c to 4.20c
No. 27	4.10c to 4.35c
No. 28 (base)	4.25c to 4.50c
No. 29	4.45c to 4.70c

No. 28, black, Chicago	3.09c to 3.19c
No. 28 galvanized, Chicago	4.59c
No. 10, blue annealed, Phila.	3.159c to 3.659c
No. 10, blue annealed, Chgo.	3.19c to 3.29c
Tin plate, 100 lb., coke base	$6.00

IRON AND STEEL PIPE

(Prices Adopted July 24, 1916.)

Steel.

Butt weld:—	Black.	Galv.
⅛, ¼ and ⅜ in.	63	35½
½ in.	67	51½
¾ to 3 in.	70	55½
Lap weld:—		
2 in.	65	50½
2½ to 6 in.	68	53½
7 to 12 in.	65	49½
13 and 14 in.	53½	..
15 in.	51	..

Iron.

Butt weld:—	Black.	Galv.
⅛ and ¼ in.	52	24
⅜ in.	53	25
½ in.	57	38
¾ to 1½ in.	60	43
Lap weld:—		
1¼ in.	48	31
1½ in.	54	38
2 in.	55	39
2½ to 4 in.	57	42
4½ to 6 in.	57	42
7 to 12 in.	56	41

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	50 to 52
Iron, 3½ to 4½ inches, l. c. l.	40 to 42

WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotations.)

Wire nails, jobbers', Pittsburgh	$2.60
Plain wire, jobbers', Pittsburgh	2.55
Galvanized wire, jobbers', Pbgh.	3.25
Polished staples, Pbgh.	2.75
Galvanized staples, Pbgh.	3.45
Barb wire, painted, jobbers' Pbgh.	2.75
Barb wire, galv., jobbers', Pbgh.	3.45

IRON AND STEEL PRICES

Corrected up to Tuesday noon

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ½ x 6 inches, smaller or shorter, rolled thread, 50 and 5, cut threads, 40, 10 and 2½, larger or longer, 35 and 2½.

Machine bolts with hot pressed nuts ½ x 4 inches, smaller or shorter rolled 50, and 10; cut, 50; larger or longer, 40 and 5.

Cold pressed, semi-finished hexagon nuts, 60 and 5.

Gimlet and cone point lag bolts, 50 and 10. Hot pressed square, blank or tapped nuts, $2.70 off list; hot pressed hexagon blank or tapped, $2.70.

Cold pressed square, blank or tapped, $2.40 off; hexagon, blank or tapped, all sizes, $2.80.

RIVETS

Structural rivets, Pbgh	4.00c
Structural rivets, Chgo. delivery	3.50c
Boiler rivets, Pbgh	4.10c
Boiler rivets, Chgo. delivery	3.60c

STEEL SHEET PILING

(Pittsburgh)

Base sizes	2.50c to 2.60c

STANDARD STEEL CHAIN

Chain, ¾ inch proof coil	5.00c to 5.50c

COLD ROLLED STRIP STEEL

Base price 6.00c to 6.50c per 100 pounds, hard, coils 1½ inches and wider and by .100 inches and heavier.

Extra for Thickness.

0.100-inch and thicker	Base
0.050 to 0.099	$0.05
0.036 to 0.049	0.20
0.035	0.20
0.031 to 0.034	0.35
0.026 to 0.030	0.45
0.020 to 0.024	0.55
0.025	0.45
0.017 to 0.019	1.35
0.015 to 0.016	1.75
0.013 to 0.014	2.45
0.012	2.80
0.011	3.15
0.010	3.50

Other extras as per card of March 15, 1916.

CAST IRON WATER PIPE

Four-inch, Chicago	$33.50 to 34.00
Six-inch and larger, Chicago	30.50 to 31.00
Six-inch Class B, New York	30.50
Four-inch Class B New York	33.50
Four to six-inch Birmingham	28.00
Six-inch and larger Birmingham	25.00

Light weight water and gas pipe $1 per ton higher than standard water.

WAREHOUSE PRICES

Steel bars, Chicago	3.10c
Steel squares, 2-in. & ov., Cleve.	3.75c
Steel rounds, 2-in. & ov., Cleve.	3.75c
Steel bars, under 2 in., Cleveland	3.25c
Steel bars, Detroit	3.20c to 3.25c
Steel bars, Philadelphia	3.00c to 3.25c
Steel bars, New York	3.00c to 3.25c
Steel bars, St. Louis	3.15c
Steel bars, Cincinnati	3.20c to 3.75c
Steel bars, St. Paul	3.20c
Steel bars, over 2-in., Buffalo	4.20c
Steel bars, Buffalo	3.35c
Iron bars, Chicago	3.10c
Iron bars, Cleveland	3.20c
Iron bars, Detroit	3.20c to 3.25c
Iron bars, St. Louis	3.10c
Iron bars, Cincinnati	3.20c to 3.75c
Iron bars, Philadelphia	3.00c to 3.25c
Iron bars, New York	3.25c
Shapes, Chgo.	3.10c
Shapes, Detroit	3.20c to 3.25c
Shapes, St. Louis	3.15c
Shapes, St. Paul	3.20c
Shapes, New York	3.00c to 3.25c
Shapes, Cleveland	3.25c
Shapes, Philadelphia	3.00c to 3.25c
Shapes, Buffalo	3.35c
Shapes and plates, Cincinnati	3.20c to 3.50c
Plates, Chgo.	3.50c
Plates, Detroit	3.60c to 4.00c
Plates, St. Louis	3.55c
Plates, St. Paul	3.60c
Plates, New York	4.25c to 4.50c
Plates, Cleveland	3.65c
Plates, Philadelphia	4.00c to 4.25c
No. 10 blue anl. sheets, Chgo.	3.40c
No. 10 blue anl. sheets, Cleve.	3.50c
No. 10 blue anl. sheets, Buffalo	3.25c
No. 10 blue anl. sheets, St. L.	3.45c
No. 10 blue anl. sheets, Cinci.	3.40c to 3.50c
No. 10 blue anl. sheets, St. Paul	3.50c
No. 10 blue anl. sheets, Detroit	3.55c
No. 28 black sheets, Chgo.	3.20c
No. 28 black sheets, Cleveland	3.20c to 3.25c
No. 28 black sheets, Cinci.	3.25c to 3.40c
No. 28 black sheets, Detroit	3.50c
No. 28 black sheets, St. Louis	3.30c
No. 28 black sheets, St. Paul	3.35c
No. 28 galv. sheets, Chgo.	4.65c to 4.75c
No. 28 galv. sheets, Cleveland	4.30c to 4.60c
No. 28 galv. sheets, Cincinnati	5.00c to 5.25c
No. 28 galv. sheets, Detroit	5.00c
No. 28 galv. sheets, St. Louis	4.75c to 5.00c

Freight Rates, Coke

Connellsville district, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.85
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

Angle bars, iron, Chicago	$18.75 to 19.25
Angle bars, steel, St. Louis	14.00 to 14.50
Arch bars and transoms, Chgo.	19.75 to 20.25
Arch bars and transoms, St. L.	19.75 to 20.25
Boiler plate, cut, No. 1, Chgo.	10.50 to 11.00
Boiler plate, cut, No. 1, St. L.	7.50 to 8.00
Boiler punchings, Chicago	13.50 to 14.00
Bundled sheet, Cincinnati	8.00 to 8.50
Busheling, No. 1, Chicago	12.00 to 12.50
Busheling, No. 1, Cincinnati	10.00 to 10.50
Busheling, No. 1, Cleveland	11.00 to 11.50
Busheling, No. 1, St. Louis	12.50 to 13.00
Busheling, No. 2, Chicago	8.50 to 9.00
Cast borings, Chicago	6.00 to 6.50
Cast borings, Cincinnati	4.50 to 5.00
Cast borings, Cleveland	6.00
Cast borings, St. Louis	6.75 to 7.00
Cast, No. 1, Chicago	11.75 to 12.25
Cast, No. 1, Cincinnati	11.50 to 12.00
Cast, No. 1, Cleveland	12.50 to 13.00
Cast, No. 1, St. Louis	11.25 to 11.75

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—

New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama canal	61.9 cents

Cut forge, Chicago	13.75 to 14.25
Iron axles, St. Louis	26.50 to 27.00
Iron axles, Cleve.	23.00 to 24.00
Knuckles, coup., Chicago	14.50 to 15.00
Knuckles, coup., St. Louis	14.75 to 15.25
Locomotive tires, Chicago	20.50 to 21.00
Locomotive tires, St. Louis	20.00 to 20.50
Machine shop turnings, Chgo.	5.50 to 6.00
Machine shop turnings, Cleve.	5.75
Machine shop turn'gs, Cincinnati	5.00 to 5.50
Machine shop turnings, St. L.	7.25 to 7.75
Malleable agricultural, Chgo.	11.00 to 11.50
Malleable agricultural, St. Louis	10.00 to 10.50
Malleable, Cincinnati	8.25 to 8.75
Malleable railroad, Chicago	11.75 to 12.25
Malleable railroad, St. Louis	11.00 to 11.50
Pipes and flues, Cleveland	11.25 to 11.50
Pipes and flues, Chgo.	10.75 to 11.25
Pipes and flues, St. Louis	10.50 to 11.00
Railroad wrought, No. 1, Chgo.	15.25 to 15.75
Railroad wrought, No. 1, Cleve.	15.00
Railroad wrought, No. 1, St. L.	15.75 to 16.25
Railroad wrought, No. 1, Cinci.	13.00 to 13.50
Railroad wrought, No. 2, Chgo.	14.00 to 14.50
Railroad wrought, No. 2, St. L.	14.75 to 15.25
Shafting, St. Louis	$17.00 to 17.50
Spring, St. Louis	13.50 to 14.00
Springs, Chicago	14.50 to 15.00
Steel car axles, St. Louis	28.00 to 28.50
Steel car axles, Chicago	28.50 to 29.00
Stove plate, Chicago	9.25 to 9.75
Stove plate, Cleveland	10.00
Stove plate, Buffalo	11.00 to 11.50
Stove plate, Cincinnati	8.75 to 9.25
Stove plates, St. Louis	9.00 to 9.50

(Gross tons.)

Axle turnings, Cleveland	$11.25 to 11.50
Busheling, No. 1, Buffalo	13.00 to 13.50
Busheling, No. 1, Pittsburgh	13.00 to 13.50
Busheling, No. 2, Buffalo	11.00 to 11.50
Bundled sheets, Pittsburgh	11.00 to 11.50
Bundled sheets, Cleveland	11.25 to 11.50
Bundled sheets, Buffalo	11.50 to 12.00
Car wheels (iron), Pittsburgh	15.50
Car wheels (steel), Pittsburgh	17.00
Car wheels, Chicago	12.00 to 12.50
Car wheels, eastern Pa.	15.50 to 16.00
Car wheels, Buffalo	13.00 to 13.50
Car wheels, N. Y.	13.50 to 13.75
Car wheels, St. Louis	12.25 to 12.50
Car wheels, Birmingham	10.00 to 10.50
Tram car wheels, B'ham	9.50 to 10.00
Cast borings, New York	7.00 to 7.50
Cast borings, eastern Pa.	9.00 to 9.50
Cast borings, Buffalo	7.50 to 7.75
Cast borings, Pittsburgh	7.25 to 7.75
Cast, No. 1, eastern Pa.	16.00 to 16.50
Cast, No. 1, Pittsburgh	14.25
Cast, No. 1, Birmingham	10.50 to 11.00
Cast, heavy No. 1, N. J. points	16.00 to 16.50
Forge, No. 1, eastern Pa.	12.50 to 13.00
Frogs, switches, guards, St. L.	15.25 to 15.50
Grate bars, Buffalo	11.50 to 12.00
Grate bars, N. J. points	11.25 to 11.50
Heavy axle turnings, Buffalo	12.00
Heavy melting steel, Pittsburgh	16.00 to 16.50
Heavy melting steel, Buffalo	15.50 to 16.00
Heavy melting steel, Chgo.	15.00 to 15.50
Heavy melting steel, Cleveland	14.75 to 15.25
Heavy melting steel, Cincinnati	14.50 to 15.00
Heavy melting steel, eastern Pa.	14.75 to 15.00
Heavy melting steel, New York	13.00 to 13.50
Heavy melting steel, St. L.	15.50 to 16.00
Heavy melting steel, B'ham	9.50 to 10.00
Iron rails, Chicago	18.50 to 19.00
Iron rails, Buffalo	18.00 to 18.50
Iron rails, Cincinnati	13.50 to 14.00
Iron rails, St. Louis	17.00 to 18.00
Iron rails, Cleveland	18.00
Iron axles, Pittsburgh	28.00
Iron axles, Cincinnati	20.00 to 20.50
Iron axles, eastern Pa.	27.00 to 28.00
Iron axles, Chicago	28.00 to 28.50
Iron axles, Buffalo	24.00 to 24.50
Low phos. steel, Buffalo	20.00 to 20.50
Low phos. steel, Pittsburgh	20.00 to 20.50
Low phos. steel, eastern Pa.	20.00 to 21.00
Machine shop turnings, Buffalo	6.00 to 6.50
Mch. shop turnings, New York	6.75 to 7.25
Mch. shop turnings, Pittsburgh	7.00 to 7.50
Mch. shop turnings, eastern Pa.	7.75 to 8.25
Malleable railroad, Cleveland	14.25 to 14.50
Malleable railroad, Buffalo	15.00 to 16.00
Malleable railroad, Pittsburgh	14.00
Malleable railroad, eastern Pa.	13.00 to 13.50
R. R. and mch. cast, No. 1 Bfl.	15.50 to 16.00
R. R. wrought, No. 1, Buffalo	17.25 to 17.75
R. R. wrgt., No. 1, eastern Pa.	20.00 to 20.50
R. R. wrgt., No. 1, New York	18.00 to 18.50
R. R. wrought, No. 1, Pbgh.	18.00 to 18.25
R. R. wrought, No. 1, B'ham	9.50 to 10.00
Reroll. rails, 5 ft. & ov., Pbgh.	16.50 to 17.00
Reroll. rails, 5 ft. & ov., Chgo.	15.75 to 16.25
Reroll. rails, 5 ft. & ov., E. P.	17.25 to 17.50
Reroll. rails, 5 ft. & ov., St. L.	16.50 to 17.00
Shafting, New York	20.00 to 20.50
Shafting, eastern Pa.	20.00 to 21.00
Shoveling steel, Chicago	14.50 to 15.00
Shoveling steel, St. Louis	14.50 to 14.75
Steel rails, short, Chicago	15.75 to 16.25
Steel rails, short, Cleveland	18.00
Steel rails, over 6 ft., Cleveland	14.50 to 15.00
Steel rails, old, B'h'm	10.50 to 11.00
Steel rails, short, St. Louis	15.50 to 15.75
Steel car axles, Birmingham	21.00 to 22.00
Steel car axles, New York	28.00 to 30.00
Steel car axles, Buffalo	26.00 to 26.50
Steel car axles, Cleveland	32.00
Steel car axles, Pittsburgh	28.00
Steel car axles, eastern Pa.	28.00 to 30.00
Stove plate, N. J. points	12.00 to 12.25
Stove plate, Birmingham	9.00 to 9.50
Stove plate, Pittsburgh	11.00 to 11.25
Stove plate, eastern Pa.	12.00 to 12.50
Wrought pipe, New York	11.00 to 11.50
Wrought pipe, eastern Pa.	13.00 to 13.50
Wrought pipe, Buffalo	12.00 to 12.50

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United Engrg. & Fdy. Co., Pittsburgh, Pa.
Wood, R. D., & Co., Philadelphia, Pa.

ACCUMULATORS. (Hydraulic.)
Southwark Fdy & Mch. Co., Philadelphia, Pa.

AEROPLANE WIRE, STRAND AND CORD.
Roebling's, John A., Sons Co., Trenton, N. J.

ALLOYS.
American Vanadium Co., Pittsburgh, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Blackwell, Geo. G., Sons & Co., Ltd., Liverpool, Eng
Bourne-Fuller Co., The, Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Central Steel Co., The, Massillon, O.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
United Steel Co., Canton, O.

ALUMINUM ALLOYS.
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM. (Granulated.)
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM. (Solder.)
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM. (Vanadium.)
American Vanadium Co., Pittsburgh, Pa.

ALUMINUM INGOTS.
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM RODS. (Sheet.)
United Smelt'g & Alum. Co., New Haven, Ct.

ANGLES, TEES, CHANNELS.
(See Steel, Structural.)

ANNEALING BOXES AND POTS.
Mesta Machine Co., Pittsburgh, Pa.
Pittsburgh Annealing Box Co., Pittsburgh, Pa.
Pittsburgh Malleable Iron Co., Pittsburgh, Pa.
Pittsburgh Valve Foundry & Const. Co., Pittsburgh, Pa.
Swedish Crucible Steel Co., Detroit, Mich.
United Engrg. & Foundry Co., Pittsburgh, Pa.
Zanesville Malleable Iron Co., Zanesville, O.

ANTIMONY.
Wah-Chang Mining & Smelting Co., New York City.

ANTIMONY OXIDES.
Wah-Chang Mining & Smelting Co., New York City.

ARMATURES.
Crocker-Wheeler Co., Ampere, N. J.
General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

ASH BUCKETS.
Lakewood Engrg. Co., Cleveland, O.

AXLES.
American Bridge Co., New York City.
Bethlehem Steel Co., So. Bethlehem, Pa.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
National Tube Co., Pittsburgh, Pa.
Otis Steel Co., Cleveland, O.

BABBITT METAL.
Keystone Bronze Co., Pittsburgh, Pa.
Lubricating Metal Co., The, New York City.

BAKERS, WIRE COATING.
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

BALLS. (Steel.)
Bethlehem Steel Co., The, So. Bethlehem, Pa.
New Departure Mfg. Co., Bristol, Conn.

BANDS. (Steel.)
Carnegie Steel Co., Pittsburgh, Pa.

BARGES. (Steel.)
American Bridge Co., New York City.

BARRELS, TUMBLING. (Wire Nails.)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

BARS—ALLOY.
Central Steel Co., The, Massillon, O.

BARS. (Concrete Reinforcing.)
Bourne-Fuller Co., Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Franklin Steel Works, Franklin, Pa.
Inland Steel Co., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Ryerson, Jos. T., & Son, Chicago, Ill.
Trussed Concrete Steel Co., Detroit, Mich.
Upson Nut Co., Cleveland, O.

BARS. (Iron and Steel.)
American Bridge Co., New York, N. Y.
American Iron & Steel Mfg. Co., Lebanon, Pa.
Belmont Iron Works, Philadelphia, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Brown-Wales Co., Boston, Mass.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Franklin Steel Works, Franklin, Pa.
Harvey, Arthur C., Co., Boston, Mass.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago, Ill
Illinois Steel Warehouse Co., St. Louis, Mo.
Illinois Steel Warehouse Co., St. Paul, Minn.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lackawanna Steel Co., Buffalo, N. Y.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Milton Mfg. Co., Milton, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Joseph T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.
Standard Gauge Steel Co., Beaver Falls, Pa.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Trussed Concrete Steel Co., Detroit, Mich.
United Steel Co., Canton, O.
Upson Nut Co., Cleveland, O.

BEAMS, CHANNELS AND ANGLES.
Belmont Iron Works, Philadelphia, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Franklin Steel Works, Franklin, Pa.
Illinois Steel Co., Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.

BEARINGS. (Ball.)
New Departure Mfg. Co., Bristol, Conn.

BEARINGS. (Vanadium Steel.)
American Vanadium Co., The, Pittsburgh, Pa.

BELLS. (Marine and Locomotive.)
Vanduzen, E. W., Co., The, Cincinnati, O.

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Graton & Knight Mfg. Co., Worcester, Mass.
Texas Company, The, New York City.
Williams, I. B., & Sons, Dover, N. H.

BELT LACING. (Leather.)
Chicago Rawhide Mfg. Co., Chicago, Ill.
Graton & Knight Mfg. Co., Worcester, Mass.
Williams, I. B., & Sons, Dover, N. H.

BELTING. (Chain.)
Link-Belt Company, Chicago, Ill.

BELTING—LEATHER.
Chicago Rawhide Mfg. Co., Chicago, Ill.
Graton & Knight Mfg. Co., Worcester, Mass.
Williams, I. B., & Sons, Dover, N. H.

BENCHES. (Steel.)
New Britain Mach. Co., New Britain, Conn.

BENCHES AND FRAMES. (Drawing.)
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., The, Cuyahoga Falls, O.

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Abramsen Engrg. Co., Pittsburgh, Pa.
Bertsch & Co., Cambridge City, Ind.
Birdsboro St'l Fdy. & Mch. Co., Birdsboro, Pa.
Cleveland Punch & Shear Works Co., Cleveland, O.
Espen-Lucas Machine Works, Philadelphia, Pa.
Hinman, D. A., & Co., Sandwich, Ill.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Niles-Bement-Pond Co., New York, N. Y.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

BENZOL RECOVERY PLANTS.
Koppers, H., Co., Pittsburgh, Pa.

BILLETS.
Andrews Steel Co., The, Newport, Ky.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Central Steel Co., The, Massillon, O.
Illinois Steel Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Lackawanna Steel Co., Buffalo, N. Y.
Otis Steel Co., Cleveland, O.
Republic Iron & Steel Co., Youngstown, O.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Upson Nut Co., Cleveland, O.
Whitaker-Glessner Co., Portsmouth Works, Portsmouth, O.
Wood, Alan, Iron & Steel Co., Philadelphia.
Youngstown Sheet & Tube Co., Youngstown.

BLAST FURNACE SKIP CARS.
Lakewood Engrg. Co., Cleveland, O.

BLAST FURNACE TUYERES.
Keystone Bronze Co., Pittsburgh, Pa.

BLAST FURNACE VOLUME METERS.
Clark, Chas. J., Chicago, Ill.

BLOCKS.
Bethlehem Steel Co., The, So. Bethlehem, Pa.

BLOOMS.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Hillman, J. H., & Sons, Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Lackawanna Steel Co., Buffalo, N. Y.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Upson Nut Co., Cleveland, O.
Wood, Alan, Iron & Steel Co., Philadelphia.
Youngstown Sh't & Tube Co., Youngstown, O

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